

The IRON AGE

February 27, 1958

A Chilton Publication

The National Metalworking Weekly



**Aluminum Makers
Push for Tonnage
Markets P. 59**

**Aircraft Booms
Despite Missile Talk — P. 83**

**New Survey Data On
Hot-Work Tool Steels — P. 99**

Digest of the Week P. 2-3

ANOTHER COPPERWELD SERVICE

*complete cold
finishing facilities*



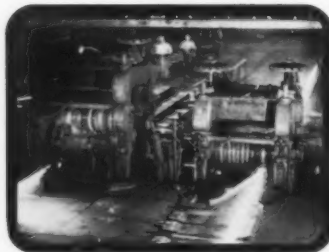
COPPERWELD STEEL COMPANY • Steel Division
4001 Mahoning Avenue • WARREN, OHIO
EXPORT: Copperweld Steel International Co.
225 Broadway, New York 7, N. Y.



Electric Furnace.



Ingot entering 35" Blooming Mill.



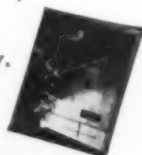
12" Bar Mill in operation.

From electric furnaces to cold finishing—close metallurgical control is the secret of the uniform quality of Aristoloy blooms, billets and bars.

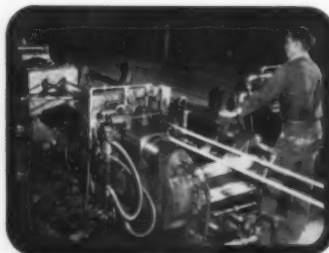
Starting with select raw materials, and exercising special care in melting and teeming operations, Copperweld produces the special Aristoloy ingot. From here, conditioning, rolling, thermal treatment, and cold drawing are under the same careful scrutiny . . . the same control. The result—steels of uniform quality bearing the name Aristoloy!

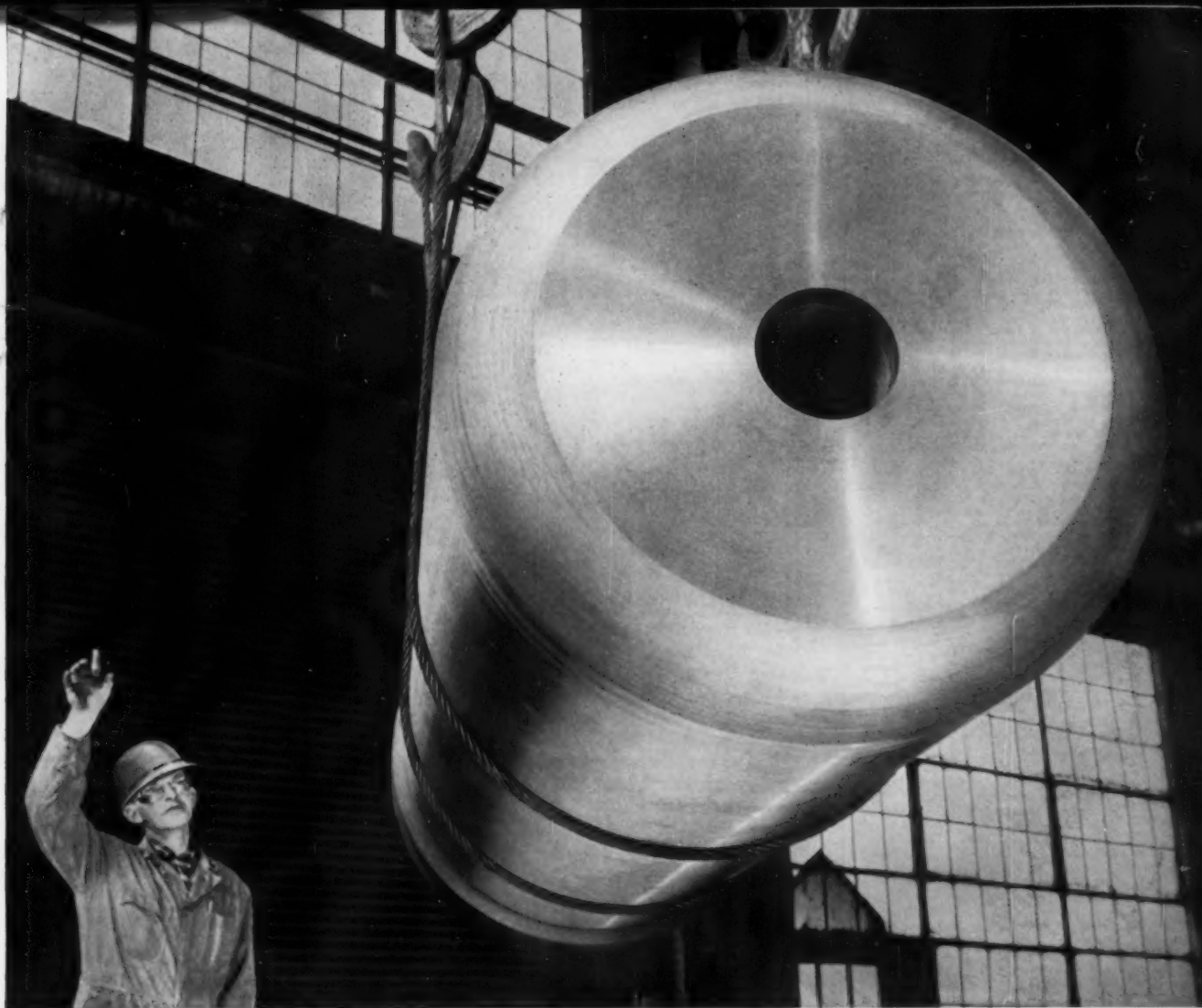
Cold finished Aristoloy as well as hot rolled products are available in standard A. I. S. I. analyses, including leaded—call your Copperweld Field Metallurgist for help in selecting the best grade for your job.

New Leaded Steel Catalog now available. Write for your copy today.



Cold Drawing.





IT HAS A JOB in one of the world's most spectacular machines

This forged-steel cylinder, one of four supplied by Bethlehem, was built for use in a king-size hydraulic jacking system. Sound rather prosaic? It isn't. The jacking devices are part of the leveling equipment in one of the world's most spectacular machines—the Marion 5760.

The 5760 is an electric power shovel so huge as to defy description. In working position the top of the boom is as high above ground as the roof of a 12-story building. Dipper capacity is 70 cu yd.

The cylinder forgings that Bethlehem furnished weigh $11\frac{1}{2}$ tons each. They are 10 ft $3\frac{1}{2}$ in. long. They have a maximum OD of 48 in. and a body OD of 45 in. In each case the diameter of the main bore is $35\frac{1}{4}$ in. These are big cylinders, rugged and

strong—as they would have to be in a shovel of such giant proportions.

You yourself may never need forgings of this general nature. Perhaps your requirements run to smaller items, or something much larger. But no matter what the design, Bethlehem is always able to meet your specifications. Bethlehem's integrated set-up can produce all types of press, hammer, and closed-die forgings, and machine them as desired. When you are next in the market, we suggest you check fully with our engineers.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
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Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



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February 27, 1958—Vol. 181, No. 9

Digest of the Week in

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NEWS ARTICLES

LINEPIPE HURT

Court Wrecks Market—A court ruling has cost steel mills one million tons of linepipe business. Here's



the story of how it happened and what is being done to remedy the crisis. P. 62

LABOR RELATIONS

Tough Bargaining—The heat will be on labor leaders this year. Business recession and bad publicity have put management on the offensive. 1958's contracts won't be based on the business levels of 1957. P. 64

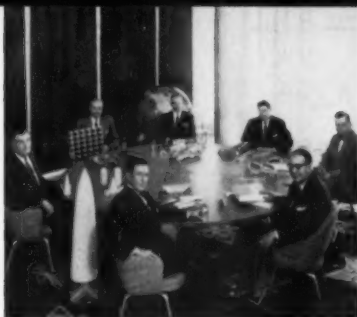
BUSINESS CHANGES

Plan to Meet Them—Management troubles during an economic squall, expert says, stem from a handful of basic areas. He recommends keeping management flexible and getting facts for accurate decisions. P. 66

AUTOMATIC STEERING

It's Coming—GM is perfecting an electro-magnetic steering system

Metalworking



ALUMINUM PARLEY: These Alcoa marketing executives (for names, see p. 61) are laying plans for one of the most far-reaching programs in the industry's history. Other producers are doing the same. They're concentrating on big markets. P. 59

for autos. A cable buried beneath the highway sends signals to a computer-servo mechanism system which guides the car. P. 76

RECIPROCAL TRADE

Extension Unlikely — Sentiment in Congress is growing against five-year extension of reciprocal trade act. President's authority on tariffs may be limited. P. 81

FEATURE ARTICLES

HOT-WORK TOOL STEELS

For Aircraft and Missiles — The combination of resistance to softening and extremely high strengths obtainable in hot-work tool steels points to a variety of aircraft and missile applications. Despite advantages, they also have their limitations. To get a complete picture, a recent survey reviews the experience of both suppliers and users. P. 99

GROWING WATER PROBLEM

What to Do About It — American industry uses more than 80 billion gallons of water daily and will double this amount by 1975. Yet this staggering thirst can be quenched successfully, because our present supply may be used indefinitely if wastes are removed. P. 103

CANEL PROJECT

How Test Chamber Was Made — To be used in developing a nuclear-powered aircraft engine, the test

chamber measures 40 ft long by 12½ ft diam. The choice of a high-strength constructional steel permits a weight saving of 90 tons. P. 106

LUBE OIL

Are You Getting Top Mileage? — A centralized aerosol lubrication system handles a total of 770 parts: 576 plain bearings, 188 gears and 6 drive mechanisms. And it does all this on a little more than a quart of oil per hour. P. 108

WELDING AIR CLEANER

Makes for Big Savings — The change to arc-welded pressed steel air cleaners reduced weight 56 pct, made a unit cost saving of 35.8 pct and a cut in manufacturing rework from 25 to 3½ pct. P. 110

MARKETS & PRICES

BRITISH STEEL

Seeks More Exports — Domestic orders are falling off in Britain but mills aren't slowing down. They're banking on increased exports to absorb new capacity and possibly set a production record. P. 68

NEXT WEEK

STAINLESS STEEL

For Satellite Nose Cone — Next week's feature describes how stainless blanks are cold-rolled into the nose cone shape. It's done by displacing metal in a spiral as the work revolves. The process minimizes stresses, obtains smooth surface.

AIRCRAFT MARKET

Still Facing the West — Don't be misled by all the talk about missiles. Construction of manned aircraft will bulwark the West Coast market for many years to come. P. 83

TAPE CONTROLLED MILLER

Pays Production Dividends — Numerically controlled miller, carving intricate parts from large blocks in aircraft machining job, is turning out better work at less cost. Two of its advantages are closer tolerance milling with fewer rejects. P. 85

STEEL ORDER PICKUP

New Business Improves — Steel sources say their incoming orders have picked up recently. It's too early to call it a trend. But the industry is hopeful. P. 139

BEARINGS SALES

Highly Competitive — Bearings manufacturers are competing strongly for sales in the present market. As a result, buyers can expect good service and fast delivery. Little market improvement is expected before fall. P. 140

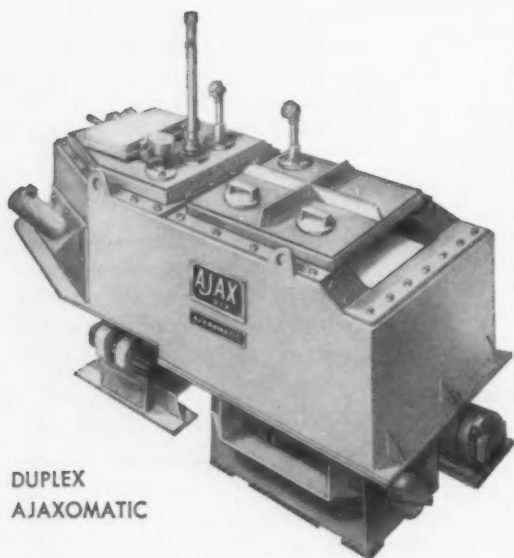


CAN WE STILL AFFORD HAND-LADLING?



AJAXOMATICS

bring automation to die casting



DUPLEX
AJAXOMATIC

The Duplex AJAXOMATIC melts aluminum pig and gates right at the die casting machine. By pushing a button the operator initiates the complete casting cycle: the die closes and the Duplex AJAXOMATIC pours the exact required amount of molten metal directly into the cold chamber. The operator just removes the finished casting at the end of the cycle.

Automation, however, is only part of the AJAXOMATIC story. The Duplex AJAXOMATIC also gives assurance of consistent quality. The quality of a finished casting begins with the proper melting of the metal. 60 cycle induction with its two basic features of internal heating and electromagnetic stirring is used exclusively in the Duplex AJAXOMATIC. Here are the unique characteristics of the Duplex AJAXOMATIC:

Precision temperature control — at low temperature	No supply ladle system or hand ladles
Alloy uniformity — no segregation	Precise weight of automatic pour
No gas porosity	Comfortable working conditions
Low metal loss	Low maintenance

The standard Duplex AJAXOMATIC is rated 120 kw to produce 500 lbs per hour of castings ranging from ½ lb to 30 lbs. Other AJAXOMATICS are available to suit a wide range of production requirements, including units supplied from central melting systems. May we have an opportunity to study your requirements?



60 CYCLE INDUCTION MELTING ENGINEERING CORPORATION

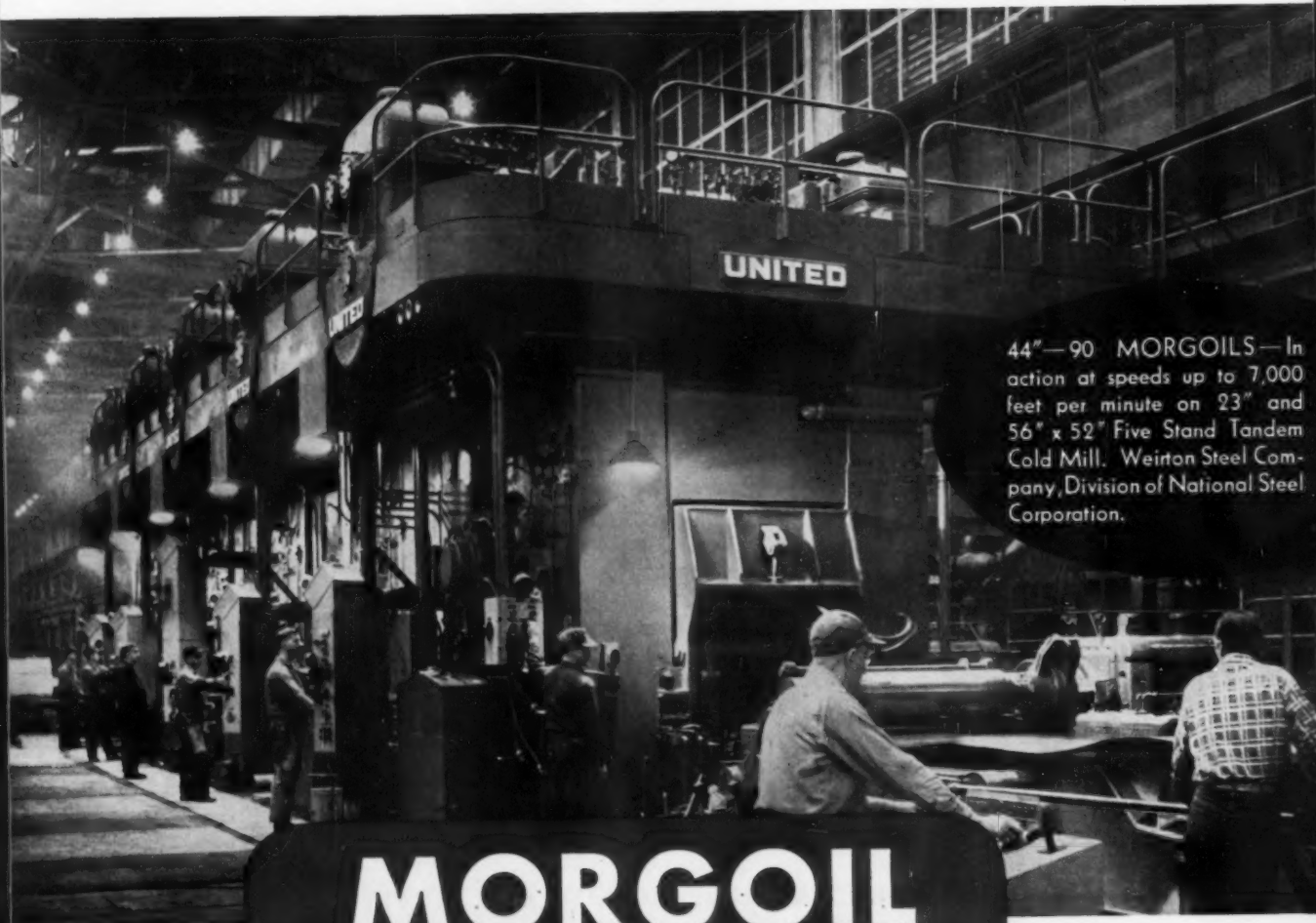
TRENTON 7, NEW JERSEY

Associated Companies:

Ajax Electrothermic Corporation

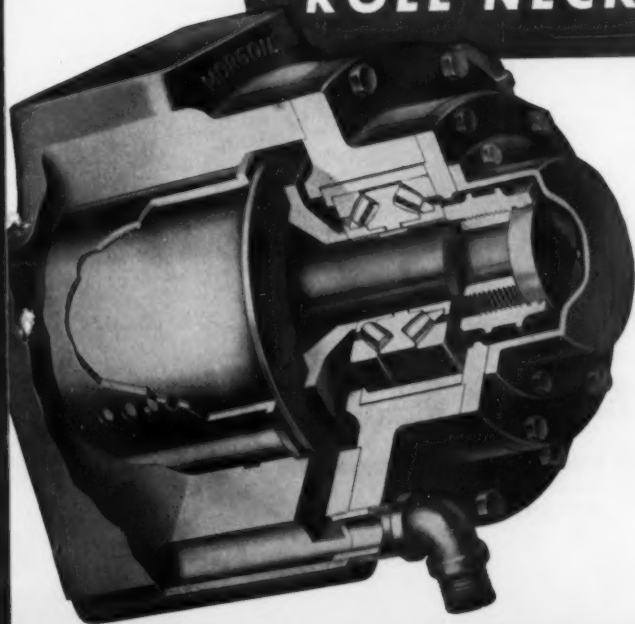
Ajax Electric Company

For HIGH CAPACITY at ANY SPEED



44" — 90" MORGOILS — In action at speeds up to 7,000 feet per minute on 23" and 56" x 52" Five Stand Tandem Cold Mill. Weirton Steel Company, Division of National Steel Corporation.

MORGOIL ROLL NECK BEARINGS

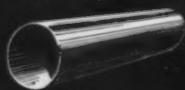


MORGOIL—the bearing that gives the greatest capacity and the longest life regardless of speed—gives modern high speed rolling mills top quality production with minimum down time due to bearing or roll neck failure.

MORGAN CONSTRUCTION CO.

WORCESTER, MASSACHUSETTS

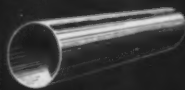
ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS
WIRE MILLS EJECTORS REGENERATIVE FURNACE CONTROL



Armco
ZINGRIP® STEEL
Tubing

Full-weight hot-dip coating of zinc does not flake or peel during severe fabrication. Resists rust.

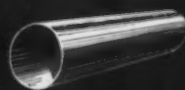
Available in O.D.'s from 3/8-inch to 3 inches; gages from 12 to 20; mechanical or pressure-tested tubing; round, square, rectangular, or special shapes.



Armco
ALUMINIZED STEEL
Type 1 Tubing

Hot-dip coating of aluminum won't discolor to 900 F—resists destructive heat scaling to 1250 F. Assures top resistance to combinations of heat and corrosion.

Available in O.D.'s from 3/8-inch to 3 inches; gages from 13 to 20; mechanical or pressure-tested tubing; round, square, rectangular, or special shapes.



Armco
ALUMINIZED STEEL
Type 2 Tubing

Also hot-dip coated with aluminum, provides outstanding resistance to atmospheric corrosion. Serves longer outdoors.

Available in O.D.'s from 3/8-inch to 3 inches; gages from 13 to 20; mechanical or pressure-tested tubing; rounds only.

for *extra* life at low cost...

Durable Coatings of Zinc or Aluminum Protect 3 Special Grades of Armco Tubing

Armco Coated Tubing grades offer all the design advantages of welded steel tubing, *plus low cost protection against corrosion.*

Special hot-dip coatings of zinc or aluminum eliminate the need for painting, plating, or other costly finishing. Just select the grade that supplies the cost-performance combination that your product requires.

For complete information, fill in and mail the coupon.

Other Armco Steels for top-quality products include Stainless Steels, ALUMINIZED STEEL, ZINGRIP®, ZINGRIP PAINTGRIP®, Cold-Rolled PAINTGRIP, Enameling Iron, High Strength Steels, Electrical Steels, Long Ternes, and high-quality Hot- and Cold-Rolled sheets.

ARMCO STEEL CORPORATION

1588 Curtis Street, Middletown, Ohio

Send me
information on

- ☐ Armco ZINGRIP Steel Tubing
☐ Armco ALUMINIZED STEEL Type 1 Tubing
☐ Armco ALUMINIZED STEEL Type 2 Tubing

We manufacture _____

Name _____

Firm _____

Street _____

City _____

Zone _____ State _____

ARMCO STEEL

ARMCO STEEL CORPORATION • 1588 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION



Our Self Reliance

What's Happened To It?

We are in danger of having too many cooks spoil the broth. Everyone has his own idea of how to cure this recession. While the cooks argue, some of us are becoming so panicky and hysterical that we already "see" a 1930-type depression in the wind.

The lack of confidence that many of us have in our country, in ourselves, and in our own company's future is shocking. This attitude may be a prime reason why some metalworking business seems to have come to a complete standstill.

Most of the various schemes and ideas about what should be done add up to the Government "doing something." Perhaps that is as it should be. The Government and the Federal Reserve Board "did something" to try to keep inflation under control. Now they should try to keep deflation from damaging the economy—a most delicate job!

President Eisenhower's attempt to re-instill confidence was a daring performance. His simple statement that things would pick up soon was direct and timely. He did not hedge or qualify as many have done. Some of his critics are now saying that he predicted an upswing in March. That isn't what he said. He said that

unemployment would drop and that the worst would be over in March. He could be right, you know.

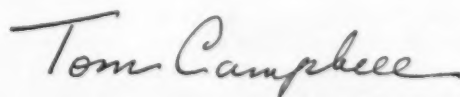
Why hasn't it occurred to us that it is tragic that we must be spoon fed good news; must be reassured always; must be told that our material wealth is not in danger; and assured that Mother Government will wipe our tears and pay our bills? What in the world is happening to us?

Of course it's proper for government to do what it can to prevent a depression or a complete standstill in business due to industrial hysteria. But it isn't right for us to expect that all the gamble, all the work, and all the worry should be taken from our shoulders.

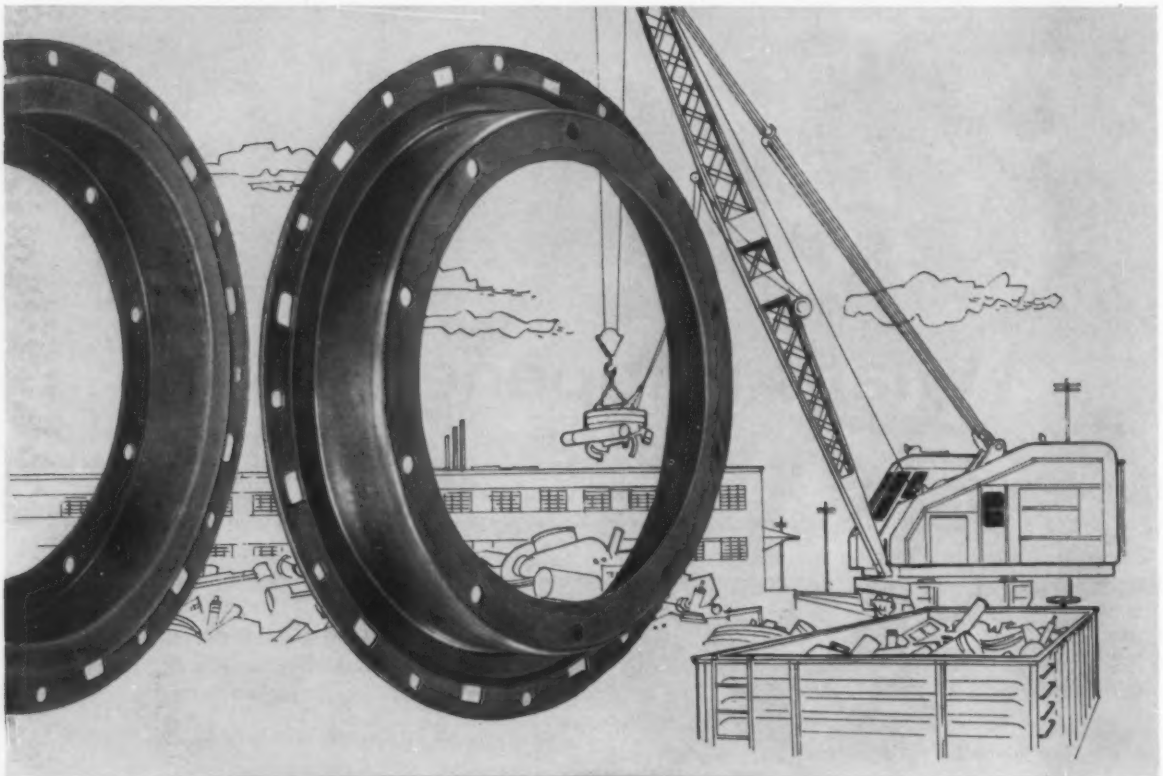
We could use some old-fashioned self-support. We used to have it before we had a crisis every other day. While the Government is trying to prevent serious deflation, let us try to do something ourselves.

Government help will never be a substitute for self reliance. Aid from Mother Government must always be paid for by taxing us and others. Let's act without requiring reassurances and coddling by the state.

Now is a good time to start!



Editor-in-Chief



Stampings simplify clutch design

Housings custom stamped to close tolerances by COMMERCIAL eliminate costly machining.

Perfect shape and alignment maintained to assure safe, accurate, dependable control.

Pioneer in the development of air-actuated, functional clutches and brakes for use in many types of industrial and construction machinery, the Airflex Division of The Fawick Corporation uses COMMERCIAL custom stampings for the housings in its Type E air-ring clutches and brakes.

COMMERCIAL helped to design the required strength and close tolerances into these stampings, built the dies to produce them, and has been turning them out for The Fawick Corporation—without change in the original design—since 1944. Stampings are produced in ten different sizes, from 12 to 40 inches in diameter, to meet the varying load requirements of Fawick Airflex Type E clutch applications.

Typical close tolerances throughout each housing of $+.005"-.000"$, $+.005"-.005"$ and $+.000"-.010"$, eliminate the need for costly machining of the stampings before final assembly



Gang-pierced in the stamped housings for the Fawick Airflex Type E clutch assembly, all holes are equally spaced $\pm .005"$ and all slots are equally spaced $\pm .010"$

Designed into the stampings as well, is the *inherent strength* required to keep the shape, alignment and overall tolerances of the housings unchanged throughout their life in the field under the most severe operating conditions—constant wear, friction and resultant destructive heat. This unvarying strength in the stampings is an important factor in the dependable and trouble-free performance of Fawick Airflex Type E clutches.

If you have a design problem involving component parts, we may be able to suggest a practical and economical solution based on our 30 years of experience in forming metals. Send details of your problem to Commercial Shearing & Stamping Company, Dept. K-9, Youngstown 1, Ohio.

LETTERS FROM READERS

Exec Rating

Sir—I thoroughly enjoyed the article, "How to Rate Executives" on p. 63 of the Jan. 30 issue of The IRON AGE. It would be appreciated if you would send me a reprint of this article.—G. Tomko, Office of Director of Mechanical Engineering, Allis-Chalmers Mfg. Co., Milwaukee.

Farm Picture

Sir—We received in the mail, several days ago, an article about the future of the farm machinery business ("Farm Picture Brightens") which appeared in The IRON AGE. We feel that it is the most encouraging article we have read on farm machinery for some time, and the reasoning back of the article sounds very logical. We immediately passed a copy of this article along to our salesmen.—H. R. McVicar, Farm Equipment Sales Co., Bloomington, Ill.

Plate Stripper

Sir—We noticed in your Jan. 16 issue mention was made of a "No-Current Plate Stripper." Basically you mention that a flaky, light organic compound is combined with sodium cyanide and dissolved in water.

Will you be able to send to the writer's attention more information on this process and where we might contact a company for complete details relative to the required equipment and procedure? —R. Fritz, Purchasing Dept., Simonds Saw and Steel Co., Fitchburg, Mass.
 ■ Write to Walker Bros., Inc., 463 Midland Ave., Detroit.—Ed.

Scientist at Liberty

Sir—Regarding some of your recent articles on the lack of Ameri-

can scientific manpower, you might be interested in my efforts as an Englishman to obtain a research post in the United States during the past two years.

Among those firms which had the courtesy to reply (the majority didn't), answers usually ran only to a suggestion that an interview might be granted if the letter writer were ever in the U. S.

And just consider these facts: A British scientist cannot be admitted to America unless there is a post waiting for him. But he can't obtain a post until he has been admitted for an interview. There are only two ways to break this deadlock. He must visit the States during a vacation for interviews, an expensive proposition. Or, more practical, the American firms must come to England for interviews.

Can't American concerns be made to realize there are a ready supply of top class research people over here just waiting for an opportunity to help? I'll willingly contact any U. S. firm interested.—Name withheld.

■ Perhaps our readers can help. We will furnish name and address of the writer on request.—Ed.

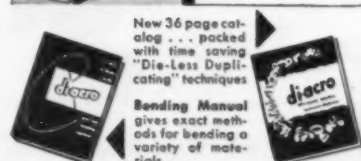


"Charlie! Charlie! Wake up!
 You'll Be Late For Home!"

Speed FORMING and FABRICATING

di-acro
 PRECISION
 METALWORKING
 MACHINES

for die-less
 duplicating



O'NEIL-IRWIN MFG. CO.
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GOODYEAR INDUSTRIAL PRODUCTS



-Specified

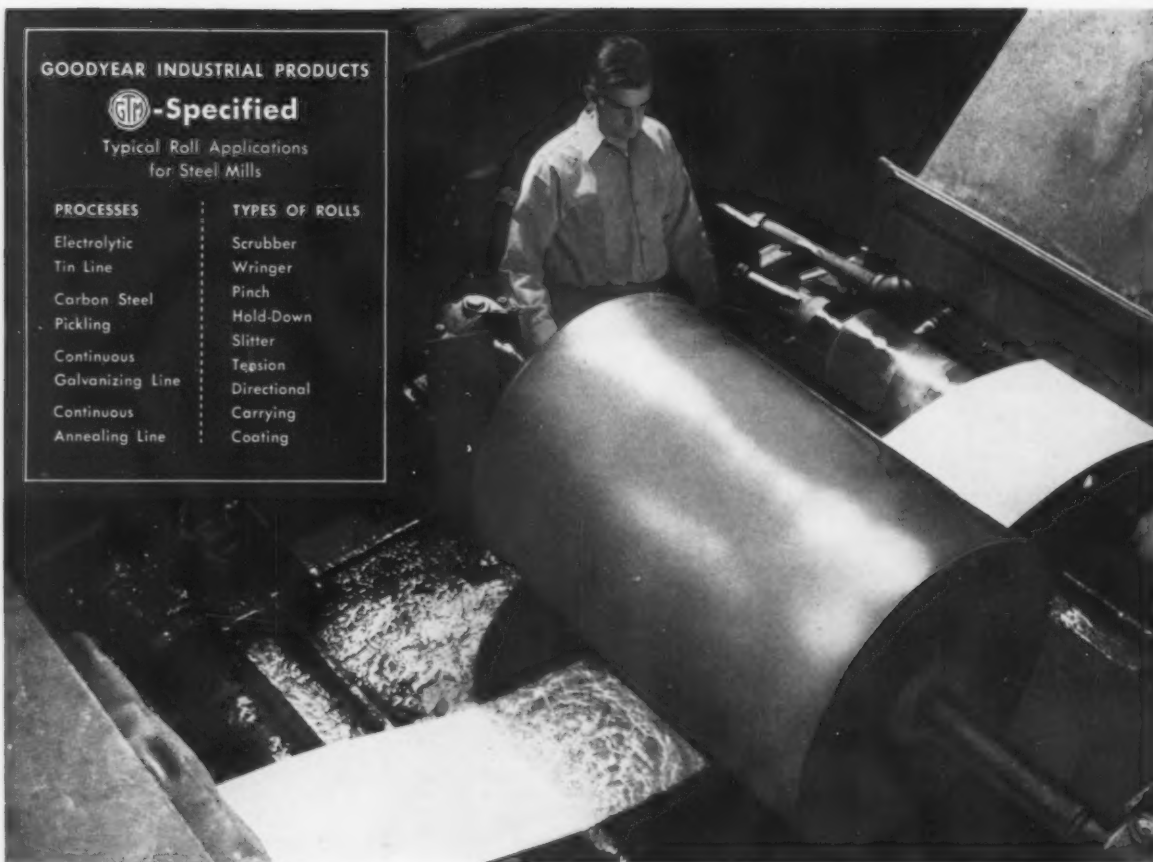
Typical Roll Applications
for Steel Mills

PROCESSES

Electrolytic
Tin Line
Carbon Steel
Pickling
Continuous
Galvanizing Line
Continuous
Annealing Line

TYPES OF ROLLS

Scrubber
Wringer
Pinch
Hold-Down
Slitter
Tension
Directional
Carrying
Coating



Want to roll up higher profits?

One way to roll up higher profits is to cut costs. And one way to do that in metal treating is to use rubber covered rolls specified by the G.T.M. —Goodyear Technical Man.

Goodyear rubber covered rolls are not made just by anyone. Their maximum performance depends upon a specialized knowledge of rubber compounding, rubber-to-metal bonding and precision manufacture — the type of knowledge personified by the G.T.M.

Remember, too, when you talk to the G. T. M.

you are talking to a corps of compounders and processors of rubber. And it's their almost 45 years' experience in industrial rubber that results in just the right compound, the lasting bond and the precise finishing needed for maximum, trouble-free roll life.

Why not talk to the G.T.M. the next time you need rubber covered rolls? You'll find it will pay off in longer life and less down time or lower costs and higher profits. You can contact him through your Goodyear Distributor or by writing Goodyear, Industrial Products Division, Akron 16, Ohio.

RUBBER COVERED ROLLS by

GOOD YEAR
THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."

FATIGUE CRACKS

Marketing Portrait

Making arrangements to photograph a group of marketing men isn't easy. You've got to choose a time—and it's rare—when they aren't busy visiting customers, potential customers, and addressing meetings and conventions.

Take, for example, the assignment we gave our photographer for this week's cover article on aluminum's market drive: Get a picture of the product managers of Alcoa and their boss, William S. McChesney, manager of industry sales, gathered at the firm's Pittsburgh headquarters.

Well, he managed to get them together when they weren't out convincing industry on the advantages of using aluminum in applications that mean large tonnage sales.

He almost got all of them together, that is. William Turbeville, manager of industrial foil sales, sits in behind a few boxes of Alcoa wrap, for John S. Hamilton, manager of foil sales.

Mobile Openhearth

The recent wave of frigid weather in the East proved auto drivers can be ingenious, if not always sensible. A strange reddish glow in the windows of a passing car caused a highway patrolman to investigate. He stopped the driver and checked. On the front seat of the car was a flat open pan of kerosene blazing merrily away. The car owner had a logical explanation, however. It seems his heater was broken and he was merely trying to keep warm. He finally escaped the chill, inside a warm courtroom.

Watch for the Dot

A sort of do-it-yourself uranium detector has been developed by Davis Detroit Co. The whole device consists of a small package about the size of a teabag.

We received ours in a promotional mailing from Wolverine Tube Div. of Calumet & Hecla, Inc.

The instructions are easy to follow. You just put the detector face down on the material or ground to be tested and leave it there for 24 hours. Then you open the package in darkness or red light, put the paper tape inside in cold water, rock it, remove film, and rinse. If dark, round dot appears you've found some uranium. If no dot appears you've got some soggy paper and some used water.

Puzzlers

We feel real, I mean real, real hurt. Take this fellow's answer. "—last week the puzzle was silly. Where did you see in the winter melons are left on melon patch?" Well now, just where have you? And the winners: Basel J. Yanchenouv, General Electric Co., Syracuse, N. Y.; (course the best answer came from L. R. Creps. Ole Creps says "the farmer could not be convicted of murder, because the coroner's report should show the boy died of shock when he discovered the pond frozen over at watermelon picking time." Other possible winners: Arnold Z. Markus, Los Angeles 23, Calif.; W. H. Paille, Attleboro, Mass.; Incidentally Ole Creps comes from Crucible Steel, Midland, Pa; and Charles J. Broska, National Lead Co., Toledo. Men, honest, we're sorry about this one. But please keep sending the money.

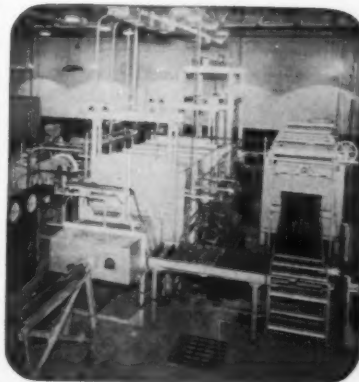
New Puzzler

Basel, of General Electric, sent this one—and many thanks.

Farmer went to the market and found that baby pig cost \$5.00, chicken \$1.00, eggs \$.05 apiece. He bought 100 items and paid \$100.00. How many of each he got?

This is on limits for Charlsie.

LABOR SAVED
50%
PRODUCTION
UP 50%



R-S . . . CONTINUOUS HARDENING, QUENCHING, DEGREASING, DRAWING LINE

It's one operation instead of four to heat treat cylinder liners at Continental Motors with the R-S equipment. Electric heat treating line is one complete unit . . . temperature is 1575° F. for hardening, it is oil quenched and the draw furnace operates at 1100° F. The atmosphere is controlled through hardening and quenching operations and capacity is 1,300 gross lbs. per hour.

R-S Heat Treating unit requires only two men instead of four with the conventional type. Production rate is up 50% . . . quality is uniformly high . . . and the unit paid for itself in 22 months.

Why not put these savings into your heat treating? Write today for your copy of the booklet on better heat treating. Ask for R-S 200. No obligation.

R-S FURNACE CO., INC.

Philadelphia 44, Pa.



Car Hearth Furnaces
Continuous Furnaces
Rotary Type Furnaces



PAYLOADER®

PURCHASE AND
HOUGH
LEASE PLANS



"... is a double-duty work horse ..."



Ludlow Valve Mfg. Co., Inc., Troy, N. Y. is a pioneer in gate valve manufacture for nearly a century. It has its own iron, bronze and steel foundries in which it uses two "PAYLOADER" tractor-shovels to speed its sand and coke handling operations. Master Mechanic Mr. Windover calls their 3 year-old roll-back model HA "PAYLOADER" "a double-duty work horse...standing up under a 16-hour day with normal maintenance and annual check-ups. The most trouble-free machine I ever had on the job."

The model HA has a payload capacity of 18 cu. ft. — the largest capacity of any tractor-shovel in its size range — can negotiate corners and narrow aisles where others can't operate. It features 40° bucket roll-back at ground level, one-lever bucket control, torque-converter drive. Hydraulic load-shock-absorber, an exclusive standard feature, cushions the loaded bucket reducing jounce and bounce and permitting higher load-carrying speeds with less materials spillage.

Your Hough Distributor will gladly demonstrate the new model HA or larger model HAH. Ask him about Hough Purchase and Lease Plans too.

THE FRANK G. HOUGH CO.

733 Sunnyside Ave., Libertyville, Ill.

- ☐ Model HA (2,000 lb. carry cap.)
- ☐ Model HAH (3,000 lb. carry cap.)
- ☐ Larger models (to 9,000 lb. carry cap.)

Name.....
Title.....
Company.....
Street.....
City..... State.....
2-A-2



Modern Materials Handling Equipment

THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



COMING EXHIBITS

Atom Fair '58 — March 17-21, International Amphitheatre, Chicago. (International Atomic Exposition, Architects Bldg., Phila. 3.)

Packaging Machinery and Materials Show — March 25-28, Convention Hall, Atlantic City, N. J. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

Industrial Development Show — Apr. 7-11, Coliseum, New York. (Woods, Donegan & Co., Inc., 48 West 48th St., New York 36.)

Design Engineering Show — April 14-17, International Amphitheatre, Chicago. (Clapp & Poliak, 341 Madison Ave., New York 17.)

Welding Show—Apr. 14-18, Kiel Auditorium, St. Louis. (Banner & Greif, 369 Lexington Ave., New York 17.)

Tool Engineers Show — May 1-8, Convention Hall, Philadelphia. (American Society of Tool Engineers, 10700 Puritan Ave., Detroit 38.)

Southwestern Metal Show — May 12-16, State Fair Park, Dallas. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

MEETINGS

MARCH

Can Manufacturers Institute, Inc.—Annual meeting, Mar. 3, Waldorf-Astoria Hotel, New York. Society headquarters, 1413 K St., N. W., Washington.

American Machine Tool Distributors' Assn.—Spring meeting, March 10-11, The Roosevelt, New Orleans, La. Society headquarters, 1900 Arch St., Philadelphia, 3.

Pressed Metal Institute — Spring technical meeting, Mar. 12-14, Sheraton-Cadillac Hotel, Detroit. Society headquarters, 3673 Lee Rd., Cleveland 20.

National Assn. of Waste Material
(Continued on P. 16)



KILL RECORD VAULT FIRES FAST

with a Kidde automatic carbon dioxide fire extinguishing system . . . the fastest, safest 'round-the-clock fire protection you can buy. At the first hot breath of fire, Kidde's rate-of-temperature-rise actuators trigger the system. Instantly, clean carbon dioxide smothers fire, vanishes into thin air. Leaves no mess. The Kidde system features all operating parts completely enclosed for safety. No falling weights, no clumsy mechanical triggering methods. Pressurized, no outside power needed. Visual indicators to show if system is set or released. Easy testing of all operating parts. No parts to replace after operation or test. For more information write for Kidde's automatic carbon dioxide fire extinguishing systems booklet today.

Kidde 

Walter Kidde & Company, Inc.
249 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd., Montreal-Toronto

900-ton giants

NIAGARA





to 15-ton work-horses

AMERICA'S MOST MODERN LINE OF PRESS BRAKES OFFERS YOU THE MOST

Take your pick! 76 standard models! Niagara offers you any press brake you need . . . and the most modern features in whichever one you choose. Like its complete, companion line of power squaring shears, the Niagara line of press brakes is America's most advanced in engineering and performance.

Collectively, Niagara Press Brakes embody an unequalled array of features to boost production, simplify operation, improve quality and cut costs:

- **Power clutch** — electro pneumatic friction, low inertia, no adjustments needed.
- **Power brake** — spring applied, air released, synchronized with clutch.
- **Power treadle** — new ease of command, no operator fatigue.
- **Ram micro-jogs smoothly, softly** to a layout line — even through work at full capacity . . . stops on a dime.
- **Press type electric controls** — for greater safety.
- **Wrap around crown** — modern, clean sweep styling.
- **Adjustable clutch torque capacity** controlled by varying air pressure to protect machine and dies against overload.
- **Heat treated and hardened steel gearing** operate in bath of oil — no open gearing.
- **Laminated non-metallic ways** — minimize wear, prevent scoring.
- **Anti-friction bearings** throughout intermediate and high speed shafts.
- **Front operated adjustable speed drives** and two-speed transmissions.
- **New, heavy duty, front operated back gages** — power or manual.
- **Self-locking power ram adjustment** with positive stops against overtravel. Direct reading counter type indicators.
- **Heat treated alloy adjusting screws** with ball joints and replaceable seats.
- **Centralized pressure lubrication** delivers oil to all main bearings, connection bearings and gibs.

Make a complete check of all the Niagara features that pay big dividends in press brake performance. Write for illustrated Bulletins 89 and 90 containing complete details and specifications on this great line of press brakes (bending capacities from 16 ga. to 1" and bed lengths from 4' to 30').

NIAGARA press brakes

NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, N.Y.

DISTRICT OFFICES: Boston • Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U. S. cities and major foreign countries

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

a
bright new
wire
with a
brighter
tighter
finish



Brytite

A PATENTED GALVANIZING PROCESS ®

SO BRIGHT—Use *Brytite* wherever a shinier, brighter zinc coating is desired for long lasting, more sparkling product appearance. Eliminate polishing and special finishing operations

SO TIGHT—*Brytite* has remarkable forming qualities. The zinc coating is so tight it will withstand severe deformation of the base metal without flaking, powdering or peeling.

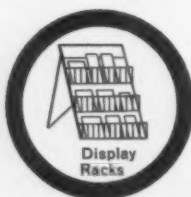
SO CLEAN AND SMOOTH—Satin smooth in looks and feel, *BRYTITE* immediately raises the quality appeal of your product. You get smoother production, too—the result of precise uniformity and quality controls.

ROUND AND SPECIAL SHAPES—*Brytite* is available in many sizes in round wire, and may on inquiry, be furnished in standard and special shapes—flat, half-round, oval, half-oval, square, rectangular, and many others.

TEMPERS AND ANALYSES—Specify *BRYTITE* in various tempers and analyses in the low carbon and medium low carbon steels.

FINISHES—Satin Finish, Unwiped (where a heavy weight of zinc coating is required) and Redrawn, in certain sizes.

no polishing...no buffing...no finishing...



withstands difficult forming operations

CONTINENTAL STEEL

CORPORATION • KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, *BRYTITE*, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence and other products.

EXHIBITS, MEETINGS

(Continued from P. 13)

Dealers, Inc.—Annual convention Mar. 15-18, Waldorf-Astoria. New York City. Society headquarters, 271 Madison Ave., New York.

Steel Founders' Society of America—Annual meeting, Mar. 17-18 Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland 13.

National Assn. of Corrosion Engineers—Annual conference and exhibition, Mar. 17-21, Civic Auditorium, San Francisco. Society headquarters, 1061 M&M Bldg., Houston.

International Acetylene Assn.—Annual spring convention, Mar. 19-21, The Bellevue-Stratford Hotel, Philadelphia. Society headquarters, 205 E. 42nd St., New York.

American Hot Dip Galvanizers Assn., Inc.—Annual meeting, Mar. 27-28, Penn Sheraton Hotel, Pittsburgh. Society headquarters, 1806 First National Bank Bldg., Pittsburgh.

American Society for Metals, The Golden Gate Chapter—Western welding, brazing and heat treating conference, March 27-28, Stanford Research Institute, Menlo Park, Calif. Information: Conference Sec'y—E. R. Babylon, Kaiser Steel Corp., 1924 Broadway, Oakland, Calif.

APRIL

Concrete Reinforcing Steel Institute—Annual meeting, Apr. 6-12, The Boca Raton Hotel, Boca Raton, Fla. Society headquarters, 39 S. Dearborn St., Chicago.

Wire Reinforcement Institute, Inc.—Annual spring meeting, Apr. 7-8, Hotel Boca Raton, Boca Raton, Fla. Society headquarters, National Press Bldg., Washington.

Industrial Fasteners Institute—Annual meeting, Apr. 8-10, Boca Raton Hotel, Boca Raton, Fla. Society headquarters, 1517 Terminal Tower, Cleveland.



Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses, and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.



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UNITED can serve you no matter where in the world you are



Introducing a complete line of quality bolts engineered by Cleveland . . . the cap screw specialist

Cleveland now offers a quality line of standard bolts in a full range of sizes. The new line includes square head machine bolts, carriage bolts, lag bolts, and plow bolts.

Our complete line of fasteners now includes bolts, cap screws, set screws, socket screw products, self-locking screws, and special headed and threaded products made to custom specifications in the size range of 3/16 through 2 1/2 in. diameters. We thus give users the important advantage of a single source of supply for major threaded fastener requirements.

Because we have the widest range of Boltmaker sizes in the world, we can supply many bolts cold forged. This method of manufacture assures uninterrupted grain flow in heads, finer finish, and high tensile strength and fatigue limit. Our unique new 1 1/4-in. Boltmaker, largest of its kind in operation, enables us to completely cold forge square head machine bolts in diameters of 3/4, 7/8, 1, 1 1/8, and 1 1/4 in. through 10 in. long.

Cleveland standard bolts are made of low carbon steel, but can be furnished in high carbon and alloy steels to

order. Bolts not of standard dimensions and types can also be supplied on special request. Our mass-production facilities insure quick delivery of bolts in case, full truck, and carload lot quantities.

Write today for complete information, samples and prices

BOLT PRODUCTS	RANGE OF SIZES
Square Head Machine Bolts	
Full size body, cut thread	1/4 in. dia. x 1/2 in. long through 1 1/4 in. dia. x 30 in. long
Undersize body, roll thread	3/8 in. dia. x 1/2 in. long through 1/2 in. dia. x 6 in. long
Carriage Bolts	
Full size body, cut thread	#10-24 dia. x 1/2 in. long through 1/2 in. dia. x 20 in. long
Undersize body, roll thread	#10-24 dia. x 1/2 in. long through 1/2 in. dia. x 6 in. long
Lag Bolts	
Square head, gimlet point	1/4 in. dia. x 1 in. long through 3/4 in. dia. x 16 in. long
Plow Bolts	
#3 head, regular and repair	5/8 in. dia. x 3/4 in. long through 1 in. dia. x 3 1/2 in. long

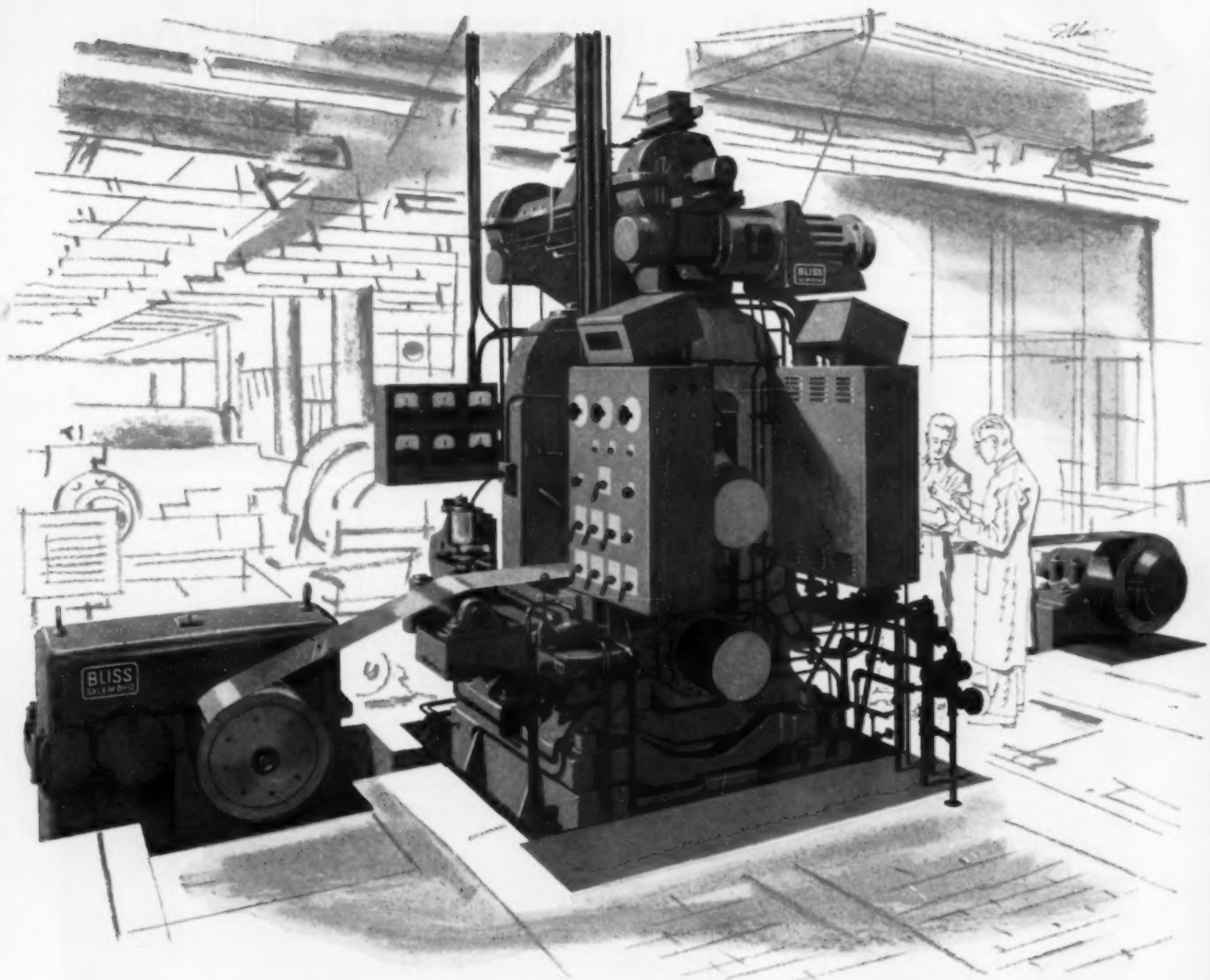
Note: Larger diameters and longer lengths made to order.
Can also be furnished in high carbon and alloy steels.

We maintain complete stocks of regular square nuts and finished and semifinished hexagon nuts, 3/8 through 2 1/2 in. diameters.



THE CLEVELAND CAP SCREW COMPANY 4444-1 Lee Road, Cleveland 28, Ohio

WAREHOUSES: Chicago • Philadelphia • New York • Los Angeles • San Francisco



This Bliss 4-high reversing mill is the principal unit in National Cash Register's new cold rolling department.

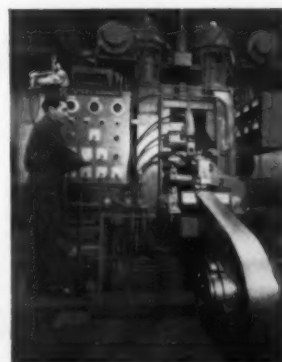
When does it pay to "roll your own"?

The National Cash Register Company's Dayton, Ohio, plant had a problem. It couldn't always get enough special strip for the stamped parts of its business machines.

National Cash Register solved the problem by deciding to "roll its own"—and then asked Bliss to help work out the equipment it would need. The end result is a complete cold rolling department, designed and built by Bliss. It includes a 4-high 5' and 16" by 12" reversing mill, a 14" shear line, and a 12" slitting line.

Today, National Cash Register tailors standard steel strip to the exact thicknesses, widths and lengths it needs. Its new Bliss equipment turns material out fast and economically, and there are no more shortages to plague the plant's press department.

This installation shows how Bliss engineers can solve a customer's problem. To see how Bliss has handled others, write today for a copy of the 60-page Bliss Rolling Mill Brochure, Catalog 40-A. It's yours for the asking.



Bliss mill rolls 10"-wide strip down to .009" at speeds up to 400 fpm.

BLISS
SINCE 1857

100 years of making metal work for mankind

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

Reinforcing Rod Plant UPS PRODUCTION 300%

Cleveland Tramrail System Pays For Itself In 6 Months

AFTER a reinforcing rod plant built a new building and equipped it with Cleveland Tramrail cranes, manufacturing costs took such a nose dive that they would make any cost-conscious plant manager blink with amazement.

Whereas eight men were required to work 8 hours to unload a 50-ton car of rods in the old building, two men using Tramrail cranes now do the job in 30 minutes. The Tramrail equipment has enabled doubling the production, and at the same time reducing man-hours by one-half. In other words, the produc-

tion per man-hour is four times what it formerly was.

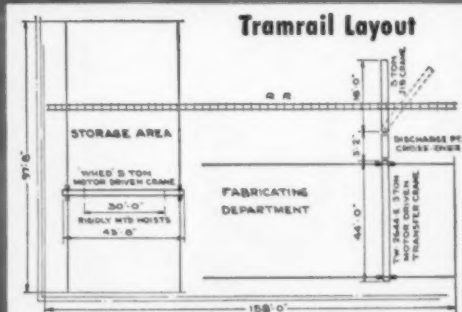
The savings have been so phenomenal that the entire Tramrail system was paid for in the first six months of operation.

Nearly every industry is securing important advantages with Cleveland Tramrail equipment. A nearby Tramrail sales engineer will gladly suggest ways that savings can be made in your plant.



5-ton crane handles 60'-0" long bundles of rod from railroad car to storage and to shear.

Outgoing truck is quickly loaded with 3-ton crane.



Note that 3-ton loads can be handled directly between jib crane and 3-ton transfer crane.



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CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
4803 EAST 290TH ST., WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Resistance Welding High Speed Cylinders



HELPS PUT PROFIT
INTO MANUFACTURING

Sciaky Techniques Provide Strength, Finish and Balance Critical to Profits in Fabricating Cleaning Drums

The advantages of strength, surface finish, weight reduction, corrosion and distortion resistance, leakproofing, etc., can actually be "welded" into a wide range of assemblies when proper resistance welding techniques are used.

A good example is the Western Laundry & Machinery Co., North Kansas City, Mo., manufacturers of dry cleaning equipment for automatic soaking, washing, and spin drying clothing. They adopted Sciaky Resistance Welding Techniques for assembling the cleaning cylinder and other components because *high strength, smooth finish and delicate balance* were essential qualities for optimum performance.

Welding Cylinder Assembly

The use of Sciaky Resistance Welding Techniques enables the cleaning cylinder assembly to withstand these difficult operating conditions:

- Rotation speeds exceed 90 miles per hour . . . and a full load of soaked clothing exerts a centrifugal force of 41,600 lbs. on sides of the cylinder. *Sciaky resistance welding techniques provide the STRENGTH required—at least as strong as either of the metals welded together!*
- To protect clothing in cylinder, there must be absolutely no rough surfaces. To verify this, all surfaces are rubbed with a 51 gauge silk stocking after assembly. *Sciaky resistance welds are practically invisible, providing exceptionally smooth surface finishes!*
- The cylinder must be perfectly balanced to prevent flying to pieces in operation. *Sciaky resistance welding virtually eliminates warpage and distortion and adds no weight to assembly!*

Broad Use of Resistance Welding

In addition to the cylinder assembly, Western Laundry uses the same Sciaky Patented Three-Phase Resistance Welder to perform seven other fastening jobs in the manufacture of this dry cleaning machine.

This broad use of resistance welding in a single product results in *improved performance standards—enables this*

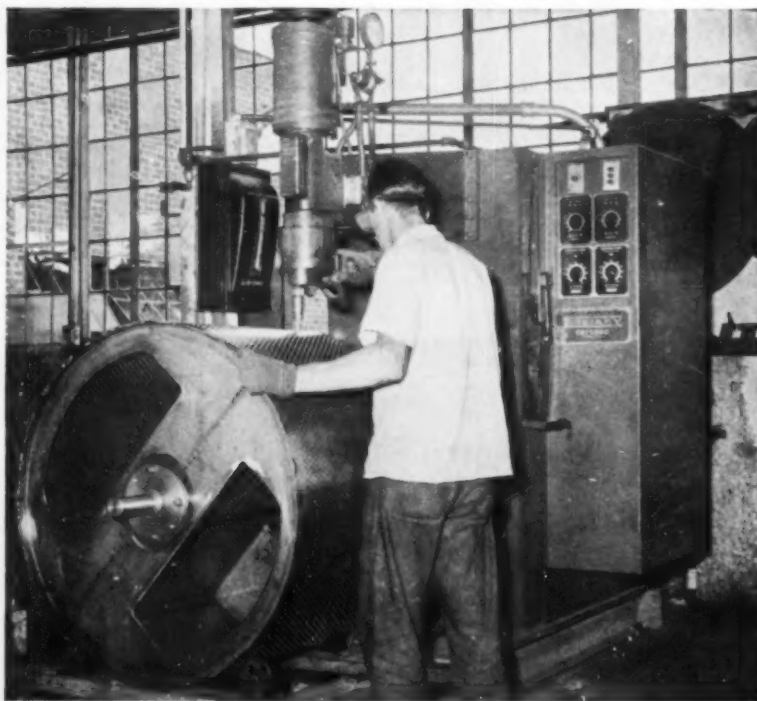


Fig. 1 Joining 12 gauge cold rolled, perforated steel cylinder wrapper to housing. Welding is accomplished at flanged edge of head. The wrapper is formed in two semi-circles. The ends of the semi-circles butt against projecting edge of two partitions. This joint is fused with an arc welding torch.

equipment to handle bigger cleaning loads faster and more profitably. Sciaky Resistance Welding Techniques help Western Laundry back up their claim that these dry cleaning machines represent lifetime purchases.

Formerly, all the fastening jobs were performed by costly riveting and fusion welding methods—which limited the operating efficiency.

Never a Breakdown

Western Laundry reports they have *never* had a breakdown of consequence since they installed their Sciaky resistance welding equipment in 1951.

Information Available

Case histories outlining the successful use of Sciaky Resistance Welding

Techniques are available on request. Specific recommendations will be furnished on receipt of an outline of your requirements.

Write today, mentioning the information you would like to receive. No obligation. Sciaky Bros., Inc., 4923 W. 67th St., Chicago 38, Illinois. POrtsmouth 7-5600.

60D

DO YOU HAVE A RESEARCH PROBLEM?

Facilities of the Sciaky Research Division at Los Angeles, California, are available for contract research to answer resistance welding problems. Write for further information and ask for 20 page Research Division brochure.

For whatever you make . . .

**N-A-X[®] HIGH-TENSILE STEEL
MEANS LIGHTER WEIGHT
WITH LONGER LIFE**



Light weight and shallow draft make the ideal commercial river barge. Thanks to the inherent qualities of N-A-X HIGH-TENSILE steel, this river barge designed and built by Nashville Bridge Company, Nashville, Tennessee, offers a weight reduction in excess of 10% over mild carbon steel—plus longer life and increased payload capacity with shallower draft.

Operators like the way weight-saving N-A-X HIGH-TENSILE improves barge towing efficiency—less draft when loaded; less dead weight to pull when empty. That means savings on operating costs all the time. And, again thanks to N-A-X HIGH-TENSILE, barge operators get more resistance to corrosion. For this manufacturing job, like so many others, N-A-X HIGH-TENSILE steel provides desirable lightness with greater durability and strength.



This barge, built by Nashville Bridge Company, hauls hot asphalt between Baton Rouge and other points along the Mississippi-Ohio River system. Both the barge hull and the cargo tanks are made of N-A-X HIGH-TENSILE. Weight reduction: in excess of 10% compared with mild carbon steel.

Check These Important Advantages for Your Job:

The N-A-X HIGH-STRENGTH steels—both N-A-X HIGH-TENSILE and N-A-X FINEGRAIN—compared with carbon steel, are 50% stronger • have high fatigue life with great toughness • are cold formed readily into difficult stampings • are stable against aging • have greater resistance to abrasion • are readily welded by any process • offer greater paint adhesion • polish to a high luster at minimum cost.

Although N-A-X FINEGRAIN's resistance to normal atmospheric corrosion is twice that of carbon steel, N-A-X HIGH-TENSILE is recommended where resistance to extreme atmospheric corrosion is important.

For whatever you make, from steel shop boxes to steel river barges, with N-A-X HIGH-STRENGTH steels you can design longer life, and/or less weight and economy into your products. Let us show you how.



N-A-X Alloy Sales Division, Dept. A-2

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • Division of

NATIONAL STEEL CORPORATION

N-A-X Alloy Sales Div., Dept. A-2

Great Lakes Steel Corp., Detroit 29, Michigan

- ☐ Please send me 12-page illustrated technical catalog on N-A-X HIGH-STRENGTH steels.
- ☐ Please have your representative contact me.

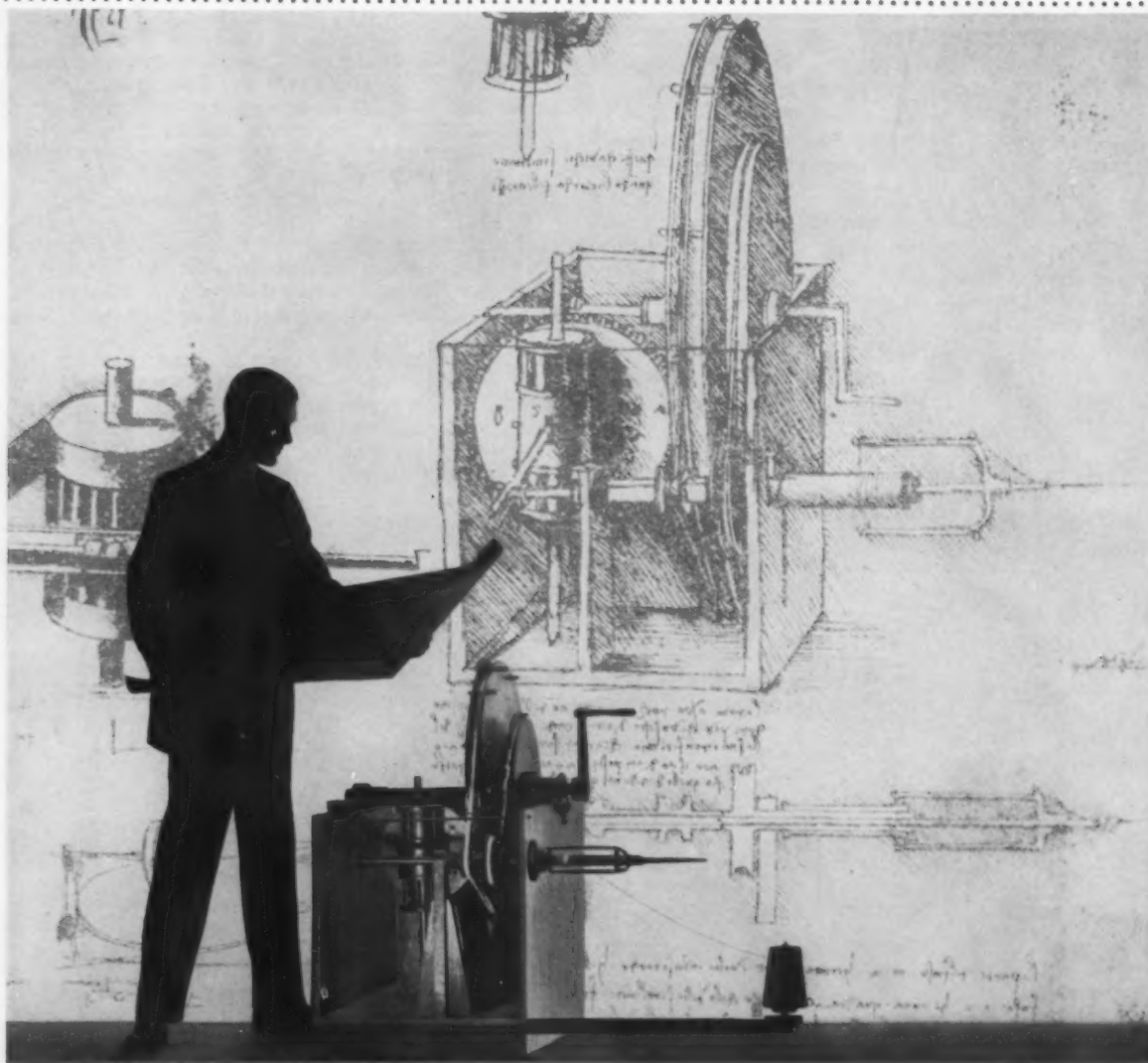
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creative designing calls for an open mind



Leonardo Da Vinci's design for a flyer spindle for a loom

Model courtesy of IBM

EVEN DA VINCI'S DESIGN COULD HAVE BEEN BETTER WITH HELP FROM AN SKF ENGINEER—

An SKF engineer never has to push one bearing over another, because SKF makes all four types of ball and roller bearings in over 3,000 sizes. This gives every SKF engineer the kind of flexibility he needs to keep an open mind on any bearing problem. Give your problem to SKF and see.

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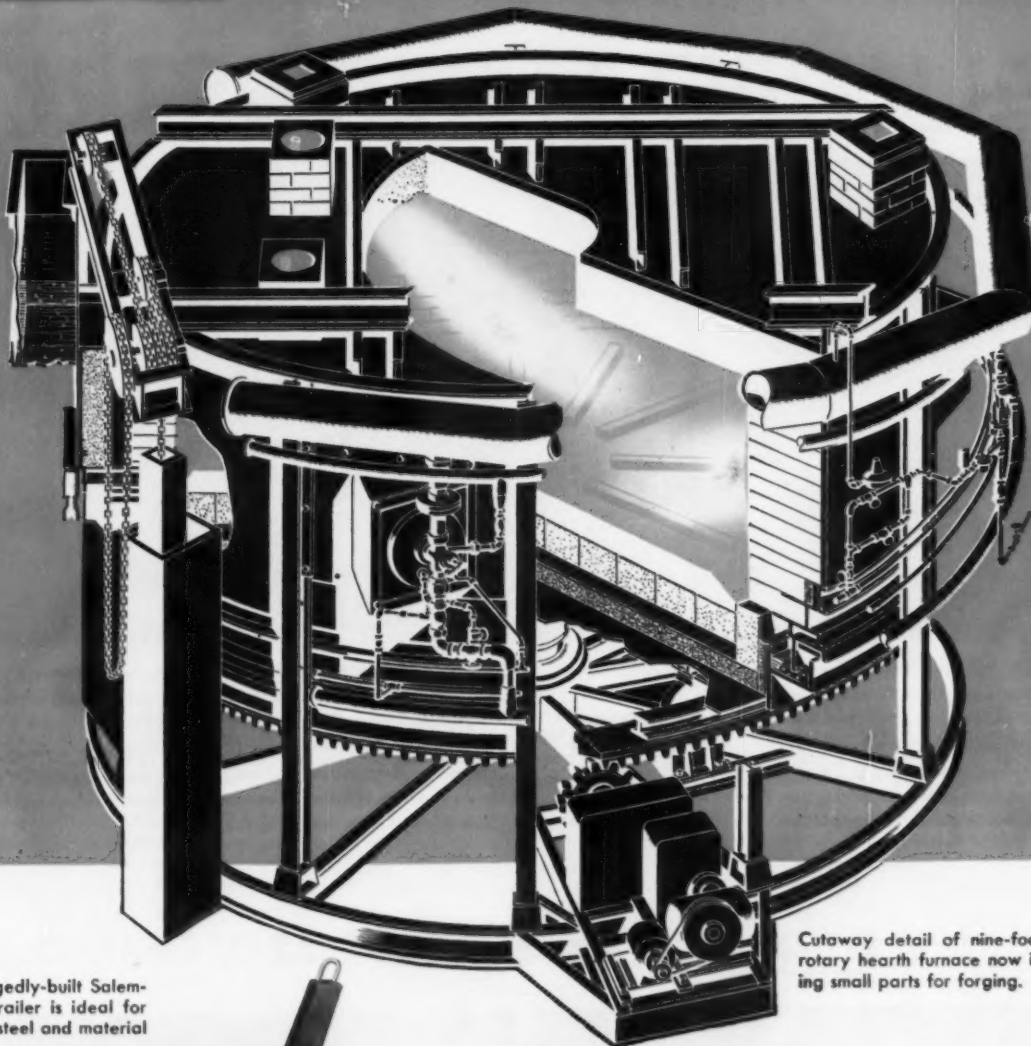
Spherical, Cylindrical, Ball, and TMTyson Tapered Roller Bearings

EVERY TYPE—EVERY USE

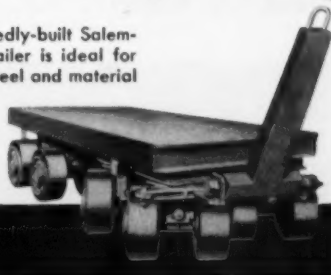
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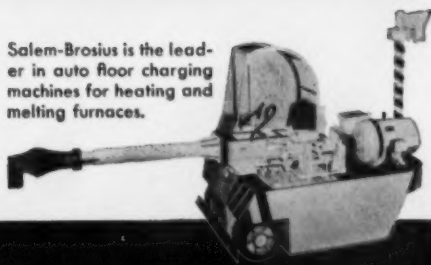
*REG. U.S. PAT. OFF.



This ruggedly-built Salem-Brosius trailer is ideal for in-plant steel and material transfer.



Salem-Brosius is the leader in auto floor charging machines for heating and melting furnaces.



Cutaway detail of nine-foot diameter rotary hearth furnace now in use heating small parts for forging.

4 good reasons why this Salem-Brosius furnace should be in your shop

Manufacturers of parts for aircraft, automobiles, machinery, home appliances and a host of other products find this Salem-Brosius rotary hearth furnace best suited to their metal heating needs for the following reasons:

1. **Uniformity of heating:** Burner positioning and hearth movement guarantee uniformly heated work—piece after piece—day after day.
2. **Continuous heating of odd shapes:** Odd shapes and sizes are heated continuously because they are not moved after positioning on the hearth until they are discharged.
3. **Automatic clearing of furnace:** Furnace is emptied of work automatically. No dummy loads are required to empty or fill furnace.
4. **Low operating cost:** Fuel efficiency, low maintenance and efficient use of plant floor space reduce production costs.

SALEM-BROSIUS, INC.

CARNEGIE, PENNSYLVANIA

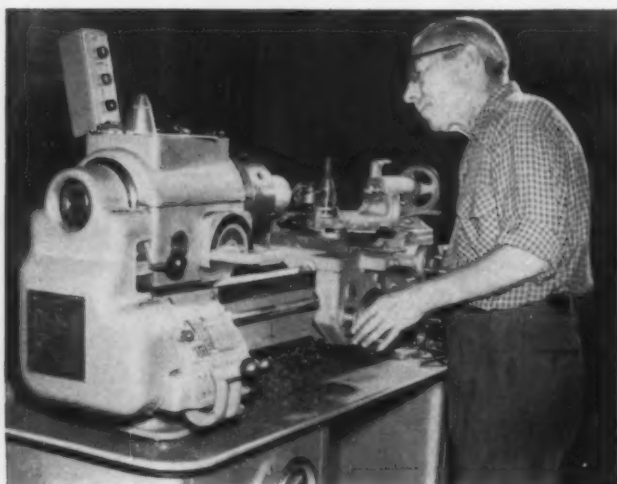
In Canada: Salem Engineering Limited • 1525 Bloor Street West, Toronto 9, Ontario

SPECIAL MECHANICAL EQUIPMENT • INDUSTRIAL HEATING FURNACES • MATERIALS HANDLING EQUIPMENT

DELTA INDUSTRIAL



DELTA 20" DRILL PRESSES are built to give you machine tool production capacity with power tool flexibility. Massive construction and rugged power make the Delta 20" a heavy-duty tool. Available with hand or power feed, choice of No. 2 or No. 3 Morse taper spindle. 28 models include floor, bench, multiple spindle and overhead types. Production tables, heads and columns available as components.



DELTA 11" METAL LATHES offer exclusive Delta Quality features such as massive head stock construction, perfected variable speed drive, unique 4-position drive selector and many more. Both 4 ft. and 5 ft. bed models available with flame hardened bed. And you get the double versatility of a ram-type turret lathe, when you add production accessories for precision multiple machining jobs.

A proved way to cut your costs

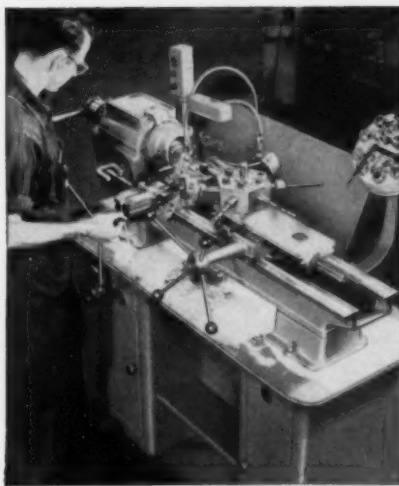


DELTA 17" DRILL PRESSES in over 70 models enable you to make your own single or multiple spindle set-up for drilling, counterboring, reaming and tapping jobs. Finest in their class, they are engineered for precision work and built for long life with low maintenance costs. Standard or power feed, high or slow speed and key chuck or tapered spindle available in floor, bench and multiple spindle models.



DELTA CUT-OFF MACHINES for fast, smooth, accurate cuts are speeding production and improving quality in tool rooms, maintenance departments and on production lines. Work head pivots for easy mitering. All belts, pulleys, cutting wheels or blades are fully enclosed for maximum safety. Whether you do wet abrasive or dry abrasive cutting, or cut non-ferrous metals or wood—you choose the model that's right for your job.

PRODUCTION TOOLING



DELTA HAND SCREW MACHINES fill the production gap between standard engine lathes and expensive, automatic screw machines . . . and at lower cost than any comparable machine. Bed turret, double tool post cross slide and lever type collet closer are standard equipment. Delta Quality features throughout assure lasting precision on multiple machining jobs.



DELTA TOOLMAKER® GRINDERS perform three precision grinding operations—surface, chip breaker and tool and cutter grinding. And with Delta 6" tool grinders, 7" standard grinders and 2½" belt grinders you have a complete line of safe, accurate, low cost grinders for every shop need.



DELTA 14" BAND SAWS These versatile, low cost machines give you eight cutting speeds—ranging from 40 fpm for metal to 3000 fpm for wood—using a standard motor. They enable you to cut stainless steel, armor plate, high speed steel, cast iron, alloy steel and dozens of other materials including woods and plastics. Available with steel or cast iron stand.

on every metalworking job



DELTA 15" DRILL PRESSES offer such Delta exclusives as six spindle adapters, "universal" hand feed, counter-balanced belt guard . . . plus big, machine tool ruggedness and proven production dependability. Delta 14" utility and 14" Super-Hi Sensitive Drill Presses also available in many models.

Thousands of metalworking plants across the country are cutting costs by using Delta Industrial Tools to supplement or replace expensive, special-purpose machines. Here's why: Delta tools are ruggedly built to withstand hard, continuous wear—they offer precision performance to meet the highest production standards—yet they cost less to buy, less to operate, and less to maintain. Completely portable, Delta tools can be moved in and out of production lines to relieve bottlenecks. And any plant can have inexpensive, automated operations through the combination of versatile, standard Delta components and automatic control devices.

Because Delta is the world's most *complete* line, you can choose the *right* tools for the biggest savings on *your* jobs.

Get all the facts on how *YOU* can cut costs with Delta Industrial Production Tooling. Write for **FREE** Delta Industrial Catalog to: Rockwell Manufacturing Co., Delta Power Tool Div., 640B N. Lexington Ave., Pittsburgh 8, Pa.

See Delta Industrial Tools at your nearest Delta Dealer . . . he's listed under "TOOLS" in the Yellow Pages.

DELTA INDUSTRIAL TOOLS

another fine product by

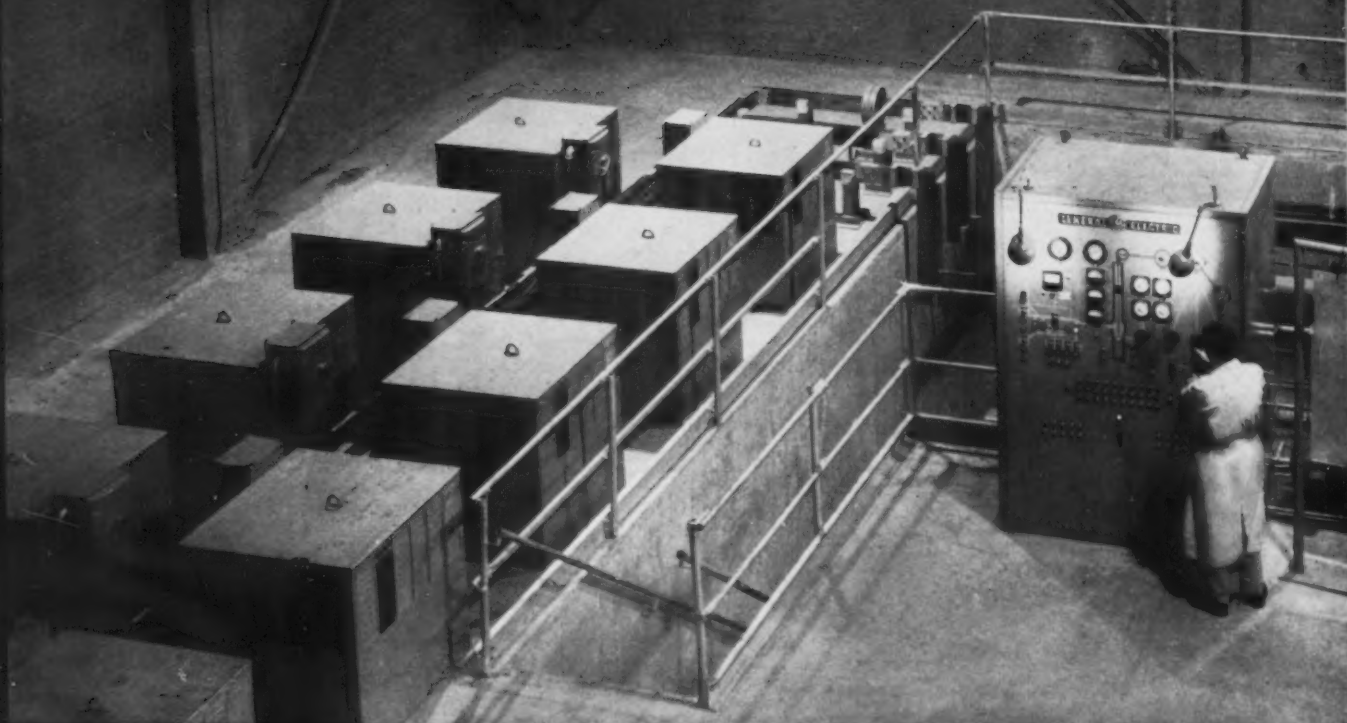
ROCKWELL





**ENGINEERING
REPORTS:**

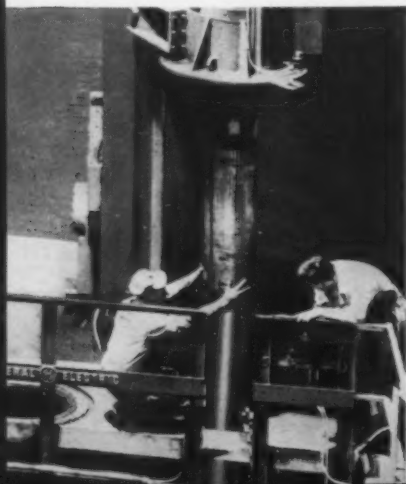
With New General Electric Vacuum Arc



NEW APPROACH to vacuum arc furnace design is reflected in this G-E installation at Universal-Cyclops Steel. Unique current collector and electrode drive permitted a lowering

in ceiling height required, helped reduce installation time and cost. G-E. offers a line of furnaces covering ingot sizes from 2½ to 30 inches in diameter, weights up to 25,000 pounds.

CURRENT COLLECTOR, being attached to electrode, provides a sliding contact—a basic G-E design improvement in vacuum arc furnaces.



ELECTRODE DRIVE SYSTEM, using amplidyne control of proven dependability, is another G-E improvement. Here, operator lowers electrode housing with electrode into furnace body.



COMPLETED molybdenum ingot, being stripped from crucible assembly, has pure, uniform-grain structure that permits faster machining.



Furnace System...

Universal-Cyclops Steel produces high-purity Moly ingots

**New current collector assembly reduces
downtime between melts, eases
handling of ingots and electrodes**

To help produce molybdenum ingots of high purity for demanding applications, Universal-Cyclops Steel Corp. recently installed a General Electric vacuum arc furnace system in its Bridgeville, Pa. plant. Such production-type furnaces are capable of melting ingots 16 inches in diameter by 66 inches long and weighing up to 5500 pounds. They are designed and engineered by General Electric as co-ordinated systems, complete with all other electric equipment needed from incoming power line to furnace arc.

Successful from the first melt

The furnace's self-supporting, unit-type construction minimized installation time and cost. Successful operation was obtained from the first melt. And Universal-Cyclops officials are completely satisfied with the ease and safety with which the furnace can be operated. These results stemmed from many newly developed features of the furnace itself, plus G-E engineering assistance during installation and startup.

Loading operation simplified

For example, a unique current collector system, using a sliding contact, picks up the arc current from inside the electrode housing. This time-tested principle is similar to that of a d-c motor commutator. This permits raising and swinging the electrode housing to one side for loading, reducing ceiling height requirements, simplifying the loading operation and the handling of electrodes. It also permits using an accurate compact electrode drive system automatically controlled by means of the more dependable, instant-acting G-E amplidyne.

Engineering assistance available

General Electric engineering services are constantly at work in the development and design of even better electrical systems for the vacuum melting industry. For instance, General Electric has completed design of a new silicon rectifier power supply for use in vacuum arc furnace systems, and is prepared to furnish these systems to your industry. From design through application, manufacturing, installation and operation, these services are available to you. Contact your local G-E Apparatus Sales Office early in the planning stage. Meanwhile, send for Bulletins GER-1450 "How to Select a Vacuum Arc Furnace," and GED-3599 "Here's Why G.E.'s Vacuum Arc Furnace Is Your Best Buy" to General Electric Company, Section 659-119, Schenectady 5, N. Y.

SYSTEM-DESIGNED G-E panel for effective control of entire operation contains instruments and devices for regulating arc voltage and current, furnace pressure, etc.

Engineered Electrical Systems for Steel Mills

GENERAL  ELECTRIC

When you buy from U. S. Steel



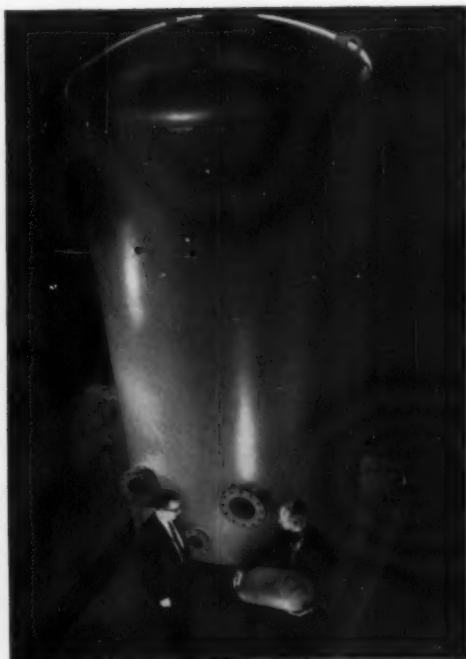
STEEL + PLUS IN ACTION: RESEARCH

A fast train is a safe train when it rides on high-quality USS Wrought Steel Wheels. To test wheels, U. S. Steel's Research Center at Monroeville, Pa., operates the world's largest inertia dynamometer. It operates at speeds equivalent to 160 mph, can generate

68½ million foot pounds of energy—enough to lift a 34,000-ton ocean liner a foot in the air. The tests indicate how changes in design, steel composition and heat treatment can further improve the quality and safety of USS Wrought Steel Wheels.

American Bridge • American Steel & Wire and Cyclone Fence • Columbia-Geneva Steel • Consolidated Western Steel • National Tube • Oil Well Supply
Tennessee Coal & Iron • United States Steel Homes • United States Steel Products • United States Steel Supply and Gerrard Steel Strapping
United States Steel Export Company • Universal Atlas Cement Company

you get **STEEL+PLUS**



STEEL+PLUS IN ACTION: **TECHNICAL ASSISTANCE**

The Cemline Corporation makes a complete line of tanks, ranging from one gallon to 6,000 gallons—including the 15-gallon expansion tank and the 3,000-gallon steam-or-electric coil-heated water storage tank shown here. For Cemline's expansion tanks used in public buildings, USS metallurgists suggested a special quality steel which enabled them to meet a new and exacting safety code, yet produce the tanks economically.



STEEL+PLUS IN ACTION: **FACILITIES**

Only United States Steel can supply pipe like this. It's called expanded seamless line pipe. The pipe is pierced from a solid billet of steel and hot-worked to size. Then, it is *cold expanded*, and this cold-working process results in improved welding properties, plus higher yield strength (at least 10% higher). The National Tube Division of United States Steel developed this new pipe, and it is available in diameters from 16 to 26 inches, in a full range of wall thicknesses.



STEEL+PLUS IN ACTION: **MARKETING ASSISTANCE**

United States Steel maintains a staff of market development specialists who work with customers, and *customers'* customers, to make the most effective use of products made from steel. The picture shows a member of our marketing team in action. L. to r.: Walter Nelson, Vice President, General Bronze Corp.; Charles LeCraw, USS Construction Specialist; John Starrett, Perkins & Will, Architects. They are working out details for a new, all-steel curtain wall building.



United States Steel

NEW GULFCUT

HEAVY DUTY SOLUBLE OIL

**for heavier cuts—at higher speeds—with longer tool life—
even in turning chrome-nickel steels and other tough alloys!**





Here are some of the first reports from the field on the performance of Gulfcut Heavy Duty Soluble Cutting Oil:

- "We grind twice as many pieces before wheel dressing!"
- "We were able to substantially increase depth of cut."
- "We get tolerances of 6 microns, instead of 16!"
- "We have been able to increase boring speeds!"

GULFCUT HEAVY DUTY SOLUBLE OIL

increases the efficiency of a wide range of machining and grinding operations...because:

1. Its lubricating-cooling-protective properties meet the heavy duty machining needs of today.
2. It permits higher speeds, deeper cuts . . . gives finer finishes, longer tool life . . . offers greater protection against corrosion . . . helps eliminate rancidity!
3. It performs efficiently even when mixed 1 to 150 parts of water . . . and has exceptionally long service life!

This new Gulf product is a heavy duty soluble cutting oil with a petro-chemical emulsifier. Its applications include heavy hogging cuts, fast fine cuts, boring, and grinding of ferrous materials, tough alloys—such as titanium and chrome-nickel-moly steels—and soft, non-ferrous metals, such as aluminum.

Shop-proved Gulfcut Heavy Duty Soluble Oil won't separate or gum in wheels, slides or ways. It contains a potent rust inhibitor which provides greater protection against rust and corrosion. It has excellent emulsion stability even in hardest water. It has high surface-wetting properties for more effective cooling. It is anti-weld,

anti-wear and anti-foam. Also contains an effective germicide to help eliminate rancidity and odor.

Get the full efficiency-economy story on new Gulfcut Heavy Duty Soluble Oil now! Call your Gulf Sales Engineer, at your nearest Gulf office, or mail the coupon.

THE FINEST PETROLEUM PRODUCTS
FOR ALL YOUR NEEDS



GULF OIL CORPORATION

Dept. DM, Gulf Building
Pittsburgh 30, Pa.

Yes! Send me illustrated bulletin on

- ☐ Gulfcut Heavy Duty Soluble Oil
☐ Gulfcut "Regular" Cutting Oils

Name

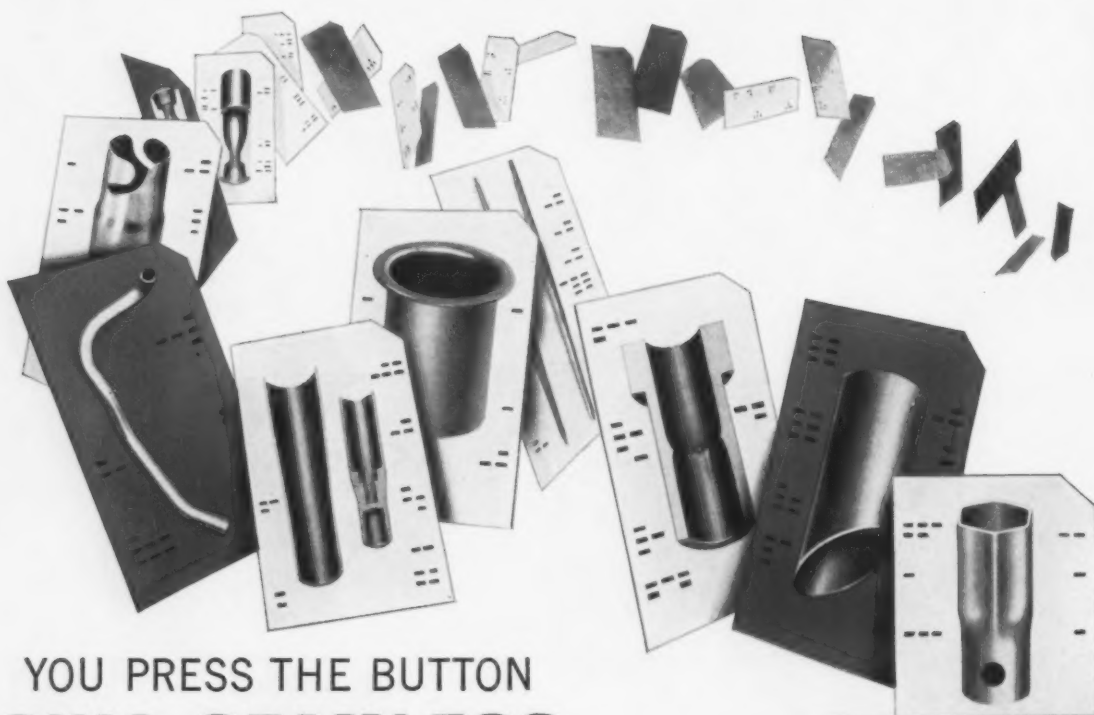
Title

Company

Address

City State Zone

When you buy from Ohio Seamless



YOU PRESS THE BUTTON **OHIO SEAMLESS** DOES THE REST

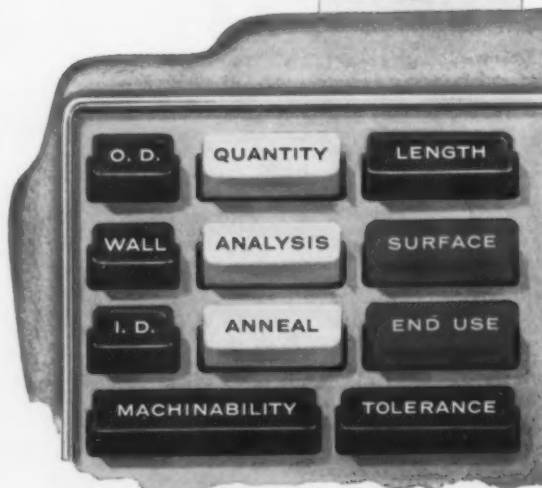
Buying steel tubing from Ohio Seamless doesn't cost—it *pays*. Our minimum quantities are generally smaller than you may realize . . . often as small as 100 to 150 feet, in certain seamless grades and sizes.

When you buy from us, you're dealing with tubing experts . . . men who can recommend the *exact* Ostuco Tubing to suit your product and processes. There's no compromise on analysis, size, anneal, etc.

Advantages of buying from Ohio Seamless multiply, the closer you examine them. Our single-source service eliminates headaches of interplant shipments . . . possible errors . . . multiple purchase orders and invoices. Ohio Seamless keeps your production lines humming because you get *precisely what you want*.

For proof, contact our nearest sales office or the plant at *Shelby, Ohio—Birthplace of the Seamless Steel Tube Industry in America.*

A.A.-7115



SALES OFFICES: BIRMINGHAM • CHARLOTTE • CHICAGO (Oak Park)
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ST. LOUIS • ST. PAUL • ST. PETERSBURG • SALT LAKE CITY • SEATTLE
TULSA • WICHITA

CANADA: RAILWAY & POWER ENGR. CORP., LTD.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
225 Broadway, New York 7, New York



OHIO SEAMLESS TUBE DIVISION

of Copperweld Steel Company **SHELBY, OHIO**

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging



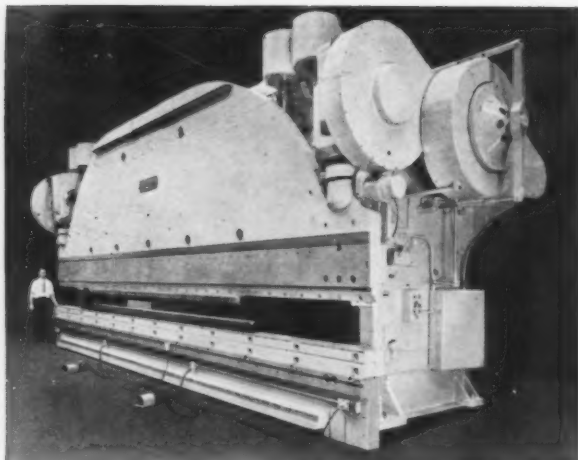
Put this truck to work . . . without buying it!

For many companies, even the savings resulting from the use of the *right* equipment is overshadowed by the capital investment necessary. The logical answer, in such a case, is to lease.

Without tying up a cent of working capital, the Clark Lease Plan permits you to select materials handling equipment from the world's *most* complete line. No down-payment or outside financing is necessary, and you have the added advantage of dealing directly with your local Clark dealer.

The savings the equipment brings are usually greater than the leasing rate. In fact, most users of the Lease Plan find the cost-cutting factors of using modern handling equipment *far outweigh* the modest monthly rates. For a detailed brochure giving full particulars of the Clark Lease Plan, simply write: Leasing, Clark Equipment Co., Battle Creek, Michigan.

CLARK[®]
EQUIPMENT



How press brake construction affects job costs

Only accurate machines can make accurate bends. The accuracy obtainable from a press brake begins with its structural rigidity. Cincinnati Press Brakes give you maximum accuracy and rigidity because of these construction features:

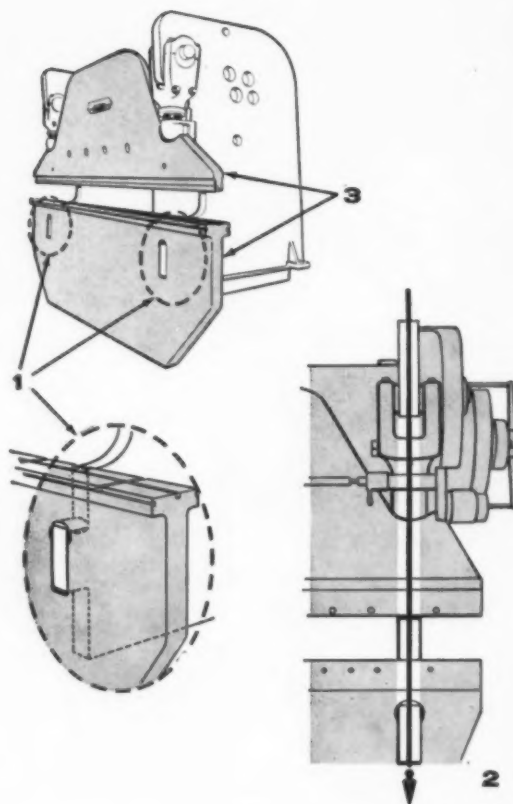
1. Interlocked construction—The bed is supported directly by the housings, by means of hand-scraped bearing shoes. No welds are used as load supports, so every Cincinnati is free from welding strains.

2. Center line loading—Since the Pitmans which drive the ram *straddle* the housings, weaving of the frame and cramping of the ram slides and shaft bearings is eliminated. All operating forces are contained within the housings.

3. Deep beds and rams—It's a simple engineering fact that the rigidity of a press brake's ram and bed increases approximately as the cube of the depth. For this reason, most of the weight of the ram and bed of a Cincinnati Press Brake is disposed in depth, rather than thickness. Tests prove their working surfaces remain parallel within .005" under capacity loads.

To you these construction features mean money saved in the long run. A Cincinnati Press Brake is more accurate than other makes when you buy it . . . and will stay that way throughout its long life.

Write department B for Catalog B-5.



Shapers / Shears / Press Brakes

THE CINCINNATI
SHAPER co.



Cincinnati 11, Ohio



Consistent Quality Has Benefits for You

The reputation of Roebling high carbon flat spring steel is based on two uncompromising facts: its unexcelled dimensional and mechanical uniformity.

They are qualities that contribute immediately and directly to *your* increased production rates and decreased rejects.

You are taking advantage of a collection of benefits when you specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.



Roebling high carbon flat spring steel is used for a wide variety of parts.

ROEBLING



Branch Offices in Principal Cities • Subsidiary of The Colorado Fuel and Iron Corporation

Roebling...Your Product is Better for it

How steam treating affects ferrous and non-ferrous metals

Use of steam atmosphere is nothing new to industrial processing but the benefits to be realized from its application in the heat treating of metals have only begun to be explored in the past few years . . . and are currently attracting an increasing amount of attention.

In scores of plants, working with both ferrous and non-ferrous metals, steam treating has proved an outstanding cost-cutter, according to F. L. Spangler, Application Engineer.



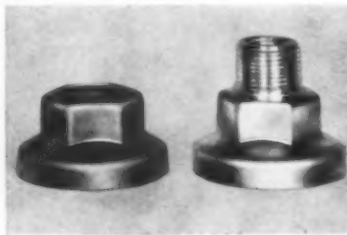
These trays of sewing machine parts are loaded for steam treating to give them a uniform, blue-black, wear-resistant finish. Since replacing the previously used bath method, steam treating has resulted in a 90% saving in direct labor and a reject problem has been eliminated.

On high-speed steel cutting tools, for instance, it keeps tools sharp

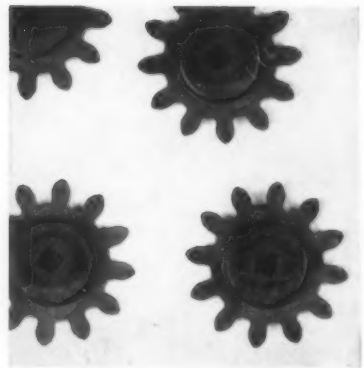
longer. Many drills, reamers, hobs, milling cutters, broaches, saws and similar tools hold their cutting edges 50 to 100% longer when steam treated after tempering and final grinding. This ratio goes up . . . often as high as 6 to 1 . . . when cutting such extra tough materials as alloyed structural steels.

On powdered iron parts, compressive strength and hardness increase appreciably. Tests of steam treated sintered compacts indicate that yield point under compression is twice that of a regular sintered compact.

To structural steel steam treating gives a uniform, corrosion-resistant, blue-black finish. When steam treating replaces chemical surface treatment, costs are usually 20 to 25%



These brass radiator steam-vent shells require nine draws and four anneals. Prior to use of a steam Homo furnace, a pickle was necessary after each anneal and a heavy pickle and buffing before final chrome plating. With steam treating the manufacturer has been able to eliminate all pickling . . . now uses only a bright dip and has substantially cut buffing time.



Powdered iron gears measuring 1 1/2" in diameter were tested for hardness on a standard Rockwell machine, before and after steam treatment. After steam treating, ten parts tested showed an average increase in hardness of 43% on the gear teeth . . . 112% on gear hubs . . . and a 26% increase in compressive breaking load.

less . . . where it is used for stress relieving or tempering prior to machining or grinding, a shot or sand blasting operation can be eliminated.

On gray iron castings steam seals microscopic porosity, improves resistance to wear and gives a high degree of corrosion resistance. Salt spray tests indicate that parts so treated stand up as well or better than cadmium plated ones.

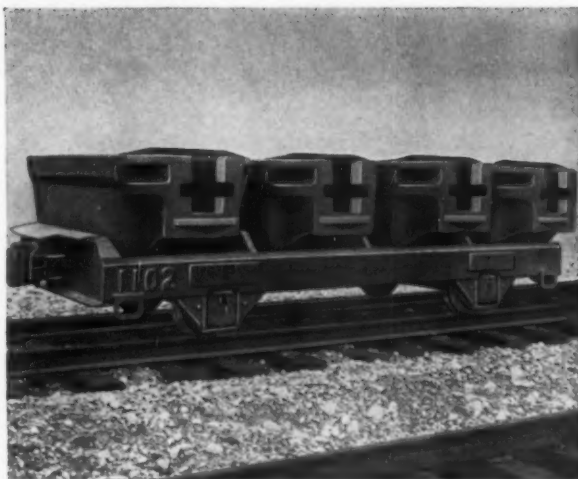
Applied to non-ferrous metals . . . brasses, bronzes, beryllium copper, aluminum, etc. . . it produces scale-free work ready for bright dip or use as-is. Within the past few years many manufacturers have substantially reduced and in some cases eliminated cleaning operations by stress-relieving, drawing, solution-treating or age-hardening in a steam atmosphere instead of air.

The equipment for this highly versatile heat treating method is safe and inexpensive . . . is ideal for installation directly in production lines.



A new 24 page catalog, The Homo Method of Steam Atmosphere Heat Treating, gives details about application of the method to a variety of parts and materials. These specific instances may suggest ways in which this unique method can go to work for you to improve product quality . . . eliminate needless operations . . . reduce costs. Just write to Leeds and Northrup Company, 4956 Stenton Avenue, Philadelphia 44, Pennsylvania and ask for Catalog TD2-620(1).

LEEDS NORTHTRUP
Instruments Automatic Controls • Furnaces

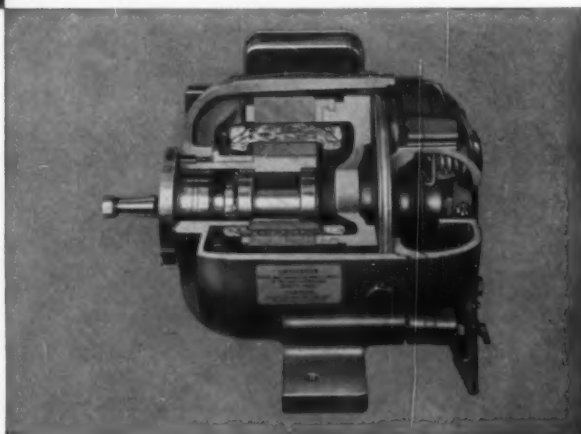


THE HEAVIER THE LOAD...

the more you need HYATTS . . . because nothing can compare with the cylindrical roller bearing for rugged, load-carrying capacity and continuous operation under adverse conditions. That's why leading steel mills specify HYATT Hy-Rolls for applications like these charging cars.

THE HIGHER THE SPEED...

the more you need HYATTS . . . because their internal clearances are stringently controlled for smoother operation. Built of the finest steels, HYATT Hy-Rolls operate with peak efficiency at high speeds as in this non-ventilated, continuous-duty textile loom motor.



THE MORE YOU NEED *Cylindrical* HY-ROLL BEARINGS



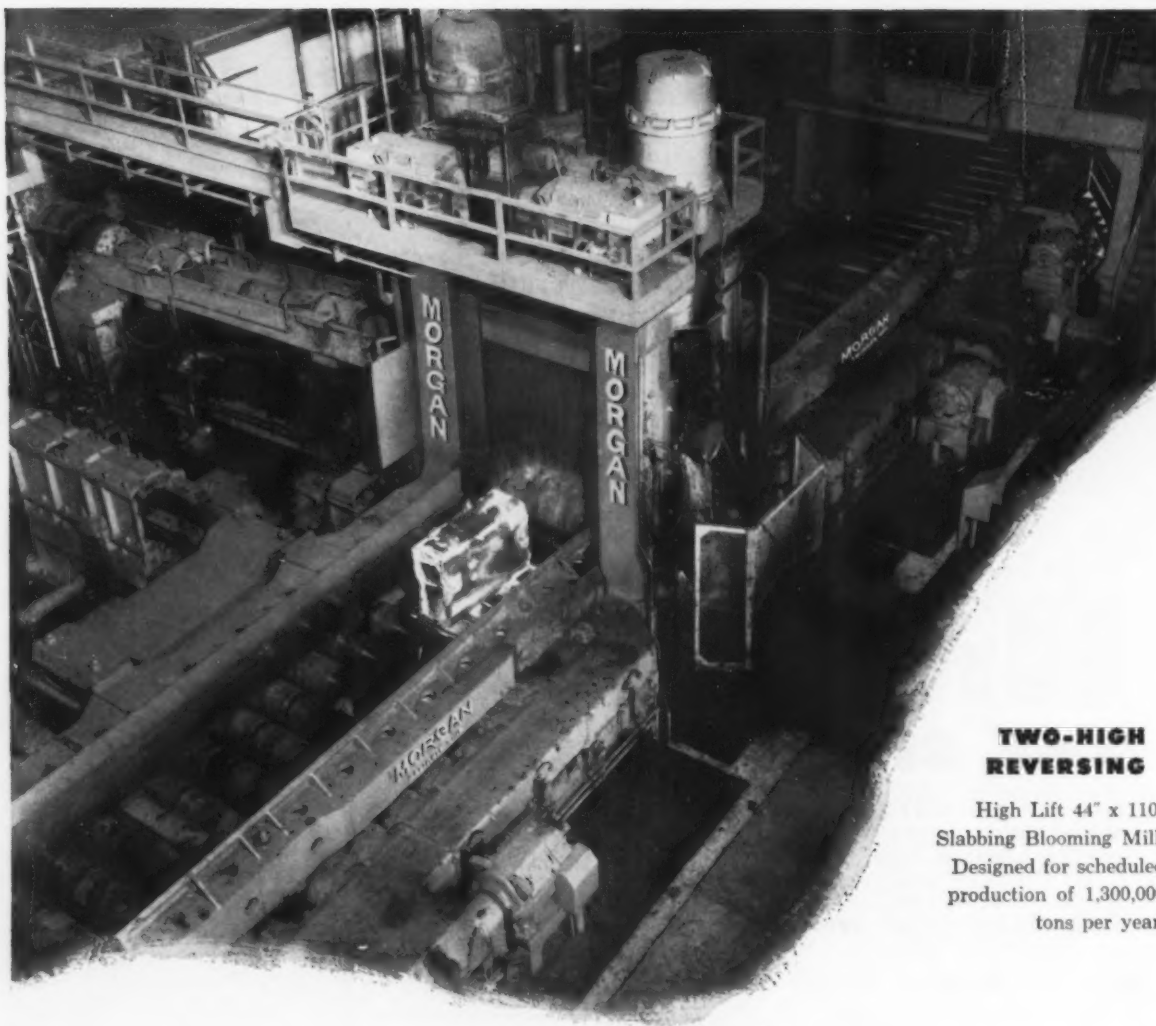
Today, as new industrial designs require heavier loads and higher speeds crammed into smaller housings, engineers are turning to HYATT Roller Bearings, America's most complete line of cylindrical roller bearings. They find their problems are solved quickly with bearings like the shouldered-race HYATT Hy-Roll that will handle heavy radial loads while taking a surprising amount of thrust. Contact your nearest HYATT Sales Engineer for recommendations—You'll find him a mighty big help! Hyatt Bearings Division, General Motors Corporation, Harrison, N.J.; Pittsburgh; Detroit; Chicago; Oakland, California.

THE RECOGNIZED **LEADER** IN CYLINDRICAL BEARINGS

HYATT

HY-ROLL BEARINGS FOR MODERN INDUSTRY





TWO-HIGH REVERSING

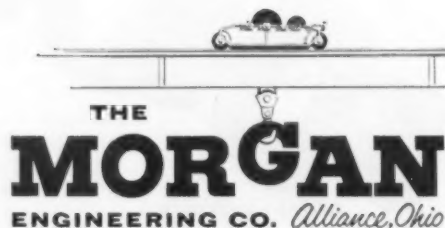
High Lift 44" x 110"
Slabbing Blooming Mill.
Designed for scheduled
production of 1,300,000
tons per year.

HOW WOULD YOU WEIGH A ROLLING MILL?

Efficient, profitable operations in a steel mill depend in large measure on continuous-flow production. Bonus capacity and *unquestionable dependability* tip the scale in favor of slabbing and blooming mills designed and built by The Morgan Engineering Company.

You weigh the cost of "the big stuff" in terms of uninterrupted production. Every part of a giant rolling mill must be engineered for *assured performance* . . . built to face up to the toughest jobs the industry will ask of it.

The Morgan Engineering Company has been known for advanced design and trusted craftsmanship for ninety years. Close contact with the ever-increasing needs of metal producers has resulted in greater speed, capacity and efficiency; lower operating and maintenance costs wherever you see the nameplate MORGAN . . . Alliance, Ohio.



Overhead electric traveling cranes, gantry cranes,
open hearth special cranes, plate mills, blooming mills,
structural mills, shears, saws and auxiliary equipment.

When
you
melt...

Lectromelt*



In the United States

Lectromelt Furnace Division, McGraw-Edison Company
312 32nd Street, Pittsburgh 30, Pennsylvania.

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Stein et Roubaix—Paris, France
S. A. Stein & Roubaix—Bressoux-Liege, Belgium

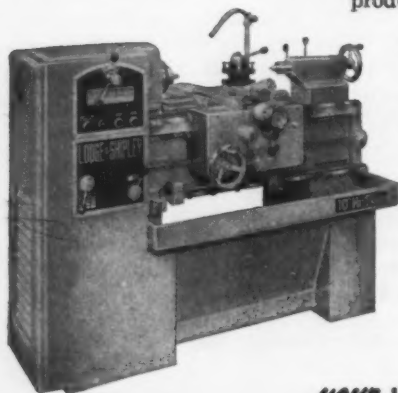
Catalog 10 describes efficient, time-proven Lectromelt furnaces and equipment.

Quick
as a...

on a lathe
specifically designed
for production
with accuracy and economy



High speed turning, boring and facing are child's play . . . with the Lodge & Shipley HI-TURN Lathe. Whether on single or multiple-piece work, this 10" Production Lathe provides productive capacity at a price substantially below conventional lathes.



Designed for fast, convenient operation, it eliminates rarely used features, incorporates many standard features never before found at any cost in a lathe of this size.

The 10" HI-TURN gives you horsepower, rigidity and production you would normally expect to find in lathes costing twice as much. We can prove more production per lathe dollar . . . more production per operator hour!

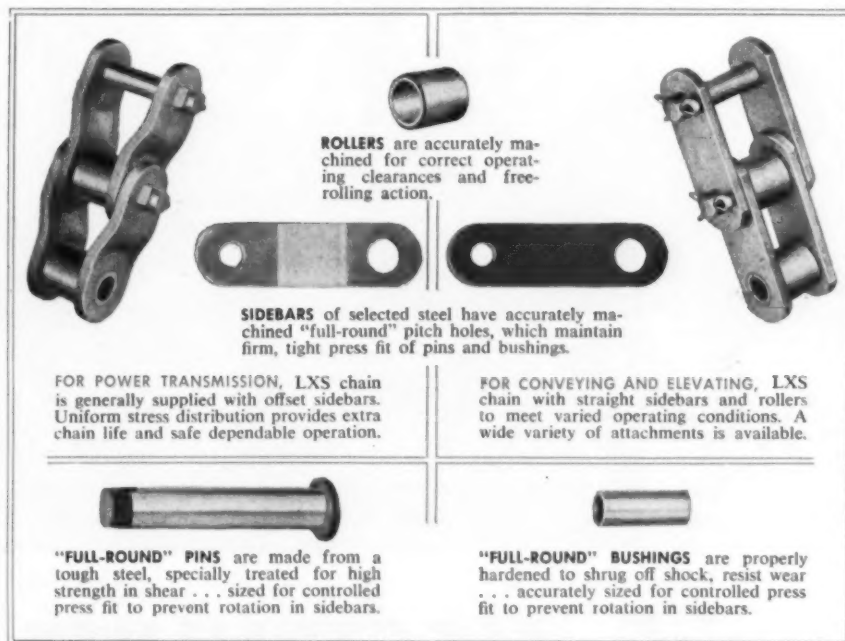
Find out how the HI-TURN Lathe fits your turning requirements.

WRITE: LODGE & SHIPLEY, 3073 COLERAIN AVE., CINCINNATI 25, OHIO

your LODGE-ical choice!

Lodge & Shipley

"Full-round" design of Link-Belt LXS chain avoids stress raisers

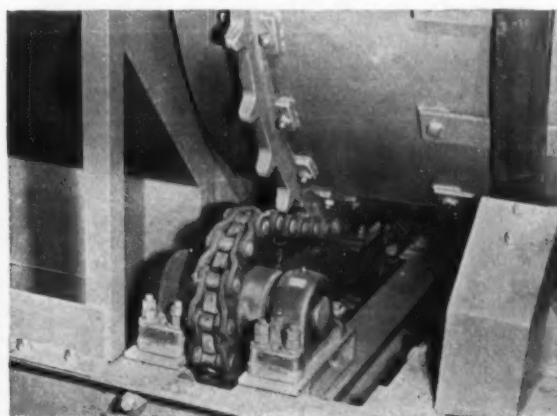


Greater live bearing area extends life

Stress concentration points are eliminated in Link-Belt LXS chain! "Full-round" design avoids sharp corners which may be the starting points of chain failure . . . provides maximum live bearing area between pin, bushing and sidebars. As a result, stress is distributed evenly . . . long chain life is assured under severe conditions.

Pins and bushings of LXS chain are accurately sized . . . assuring controlled press fits, preventing rotation in sidebars. Similar accuracy in machining of sidebars permits close control of pitch and proper chain length after assembly.

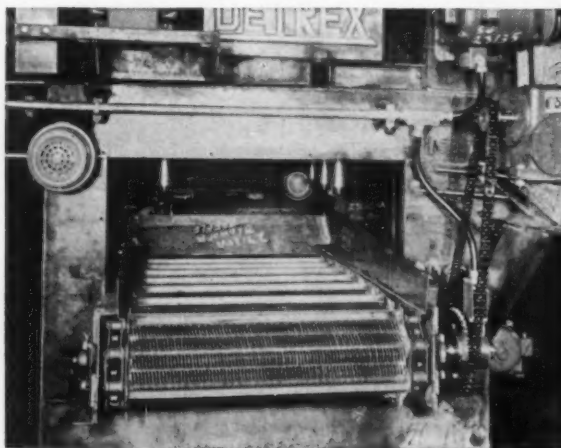
Other long-life features of Link-Belt LXS chain include use of selected steels and controlled hardening of all parts. Both contribute to greater endurance . . . greater uniformity.



LXS drives stand up to impact and abrasive service

Large, live bearing area makes LXS chain ideal for exposed drives and abrasive conditions such as found on this heavy rotating drum. Uniform distribution of load over ample bearing area reduces cutting action of abrasives . . . extends chain life.

LXS chain has stamina required for long, heavy-duty conveyors



With its exceptional strength and wear resistance, Link-Belt LXS chain can easily meet rugged conveying and elevating requirements. Due to accuracy of pitch and attachment spacing, plus close matching of multiple strands, LXS has the added strength and wear life necessary for the extra-long conveyors so important to today's highly mechanized industry.

HEADQUARTERS for chains, sprockets and other Link-Belt products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Refer to the Yellow Pages of your local Phone Directory.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

LINK-BELT
CHAINS AND SPROCKETS

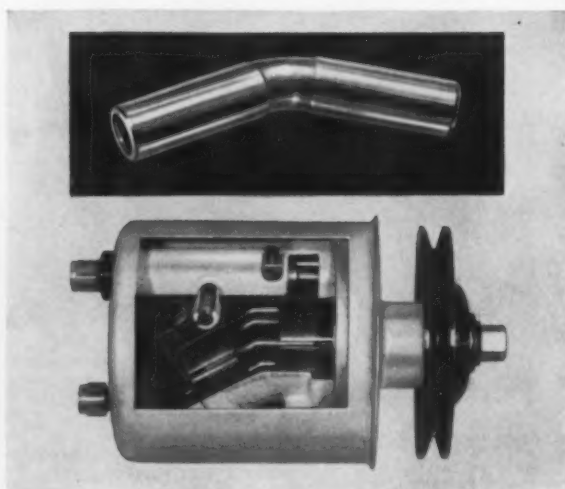
...Flange it!
Flare it!
Bend it!
Expand it!



Republic ELECTRUNITE

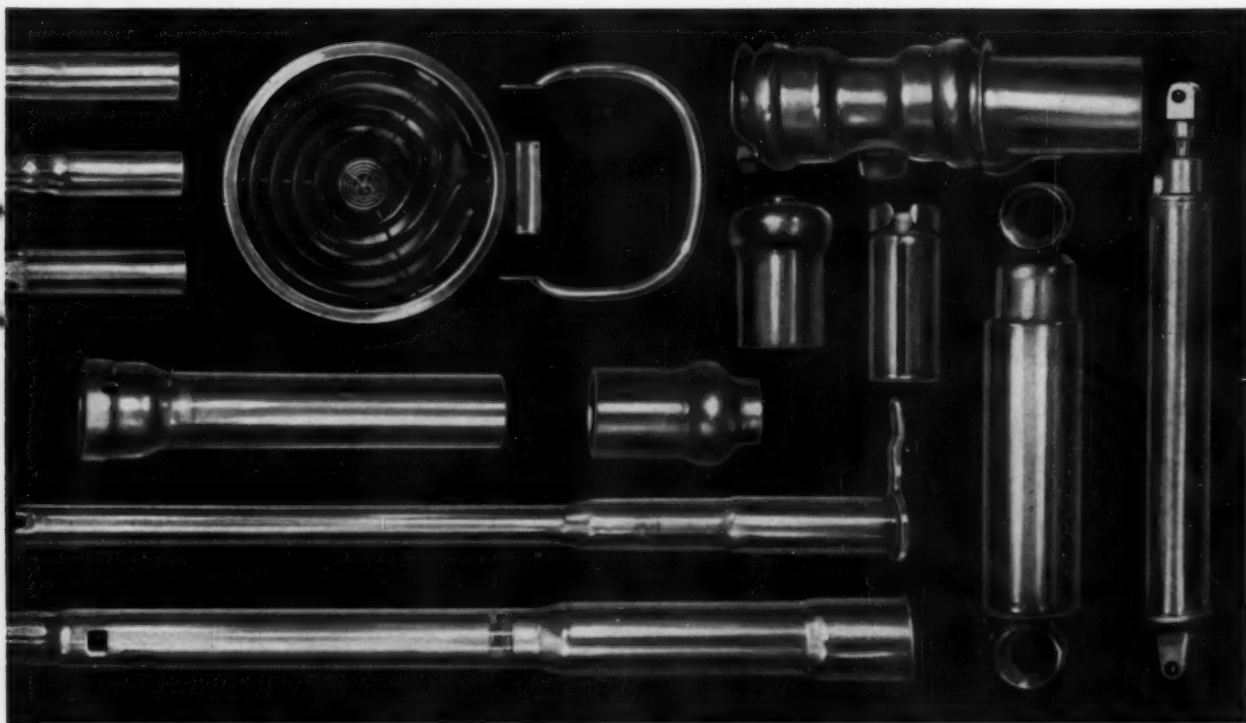


RANGE BURNER MANUFACTURER STEPS OUT with Republic ELECTRUNITE Mechanical Tubing. Harper-Wyman Company uses it in forming light-weight, easy-to-clean venturi burner tubes. The company subjects ELECTRUNITE to a hairpin bend of $1\frac{1}{4}$ diameter radius, then a four-way crimp, followed by punching, notching, and welding. Uniform, predictable ductility avoids stretch and collapse as tubing is severely bent and formed. Republic engineers will help you design ELECTRUNITE into your product to speed production, cut costs, and improve performance. Mail the coupon for facts. Or call your Republic representative.



WHEN IT'S MOVING . . . MAKE IT TUBING

Republic ELECTRUNITE meets all close tolerance requirements for new Thompson Products automotive pump. Close tolerance, uniformity, ductility, workability — four important performance requirements, all reasons why Republic ELECTRUNITE Mechanical Tubing is used in a new automotive hydraulic power pump assembly. This pump furnishes power for power steering featured by a nationally famous automobile manufacturer. Will-O-Hill Industries, Inc., Willoughby, Ohio, sub-contractor, manufacturers and specialists in close tolerance tubular stampings, cut $\frac{3}{16}$ -inch diameter ELECTRUNITE into units $2\frac{3}{8}$ inches long. Each unit is rolled to form a slight groove in the center and bent to an angle of exactly 150° . Nine such pieces are used in each pump assembly. For additional information, send coupon or write today.



Mechanical Tubing

fabricates easily...economically...with uniformity

Quality makes the big difference!

Republic ELECTRUNITE® Mechanical Tubing is quality-controlled from ore to finished product; produced from highest quality flat-rolled open-hearth steel made in Republic's own mills; carefully inspected to Republic's rigid requirements. Republic Tubing is welded by the exclusive ELECTRUNITE process—a continuous electric weld method that unites the wall under pressure without the addition of foreign or extra metal. Tests prove the ELECTRUNITE weld is as strong or stronger than the original base metal.

Among other advantages, this process assures uniformity of wall thickness, strength, ductility, concentricity, diameter, and physical and mechanical properties. And as the world's largest producer of specialty welded tubing, Republic has the facilities, abilities, and equipment to tailor the tube to your end use. Republic also offers complete tube fabricating facilities.

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DEPT. C-5160

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- ☐ Fabricating Facilities
- ☐ Please have a Republic Engineer call

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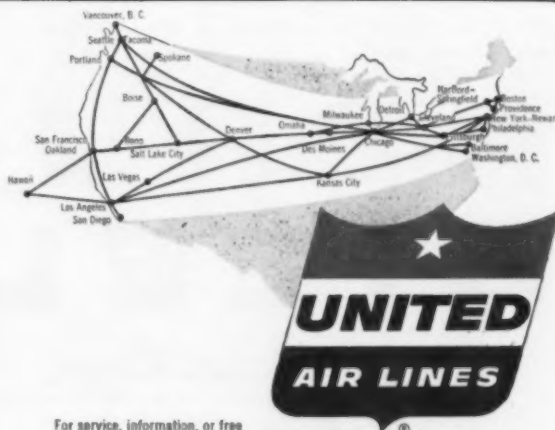
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Maximum speed	365 mph	300 mph	365 mph	331 mph	331 mph
Unlimited reservations	Yes	No	No	No	No
Airports served directly	69	14	61	11	46
All-radar fleet	Yes	No	No	No	No

BEFORE YOU SHIP, COMPARE UNITED with other major air carriers. You'll find that no airline is faster. None equals United's 69-airport coverage. You'll note that only United offers you *unlimited* reservations — guaranteed space aboard 832 cargo and passenger flights. And United is the only coast-to-coast airline with radar on every plane for more on-time dependability.

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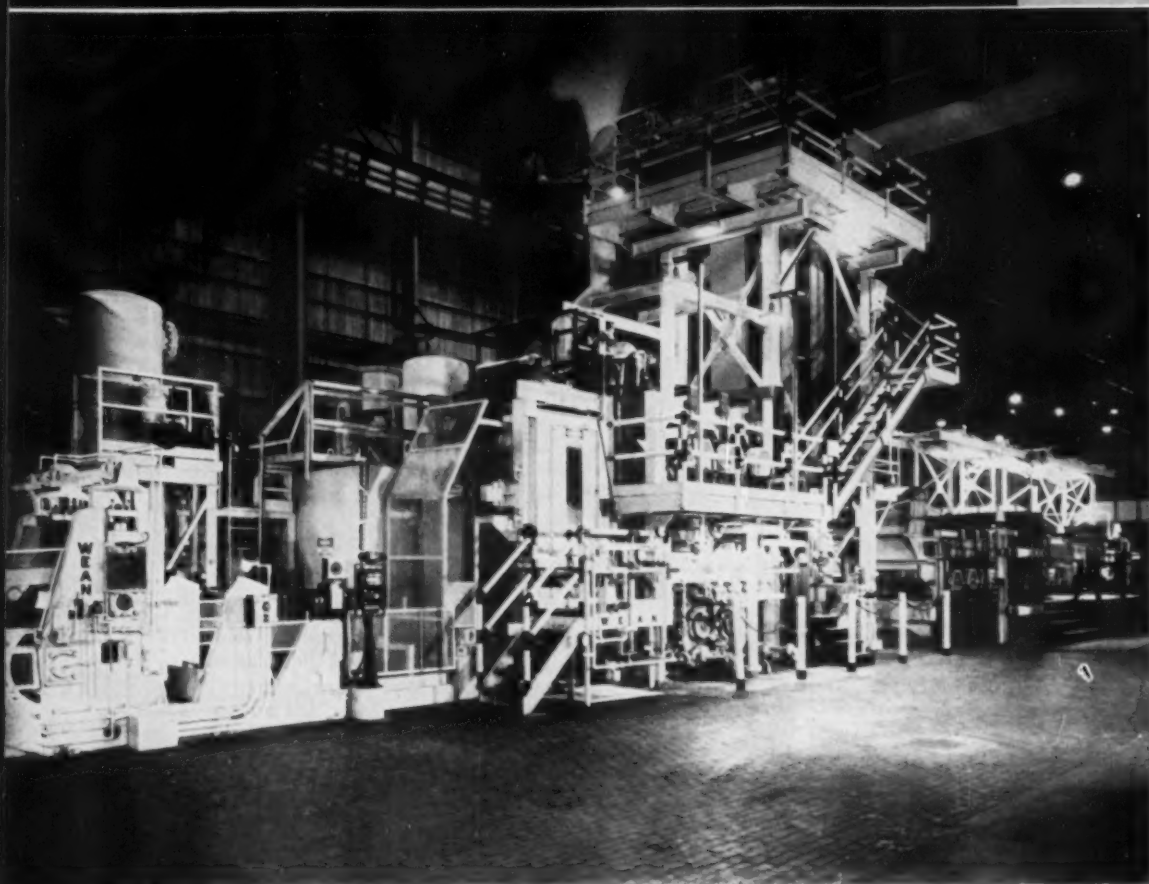
For service, information, or free Air Freight booklet, call the nearest United Air Lines Representative or write Cargo Sales Division, United Air Lines, 36 South Wabash Ave., Chicago 3, Illinois.

IT COSTS NO MORE FOR EXTRA DEPENDABILITY—ON UNITED, THE RADAR LINE

Electrolytic tinning lines maintain highest product quality through



WEAN CREATIVE ENGINEERING



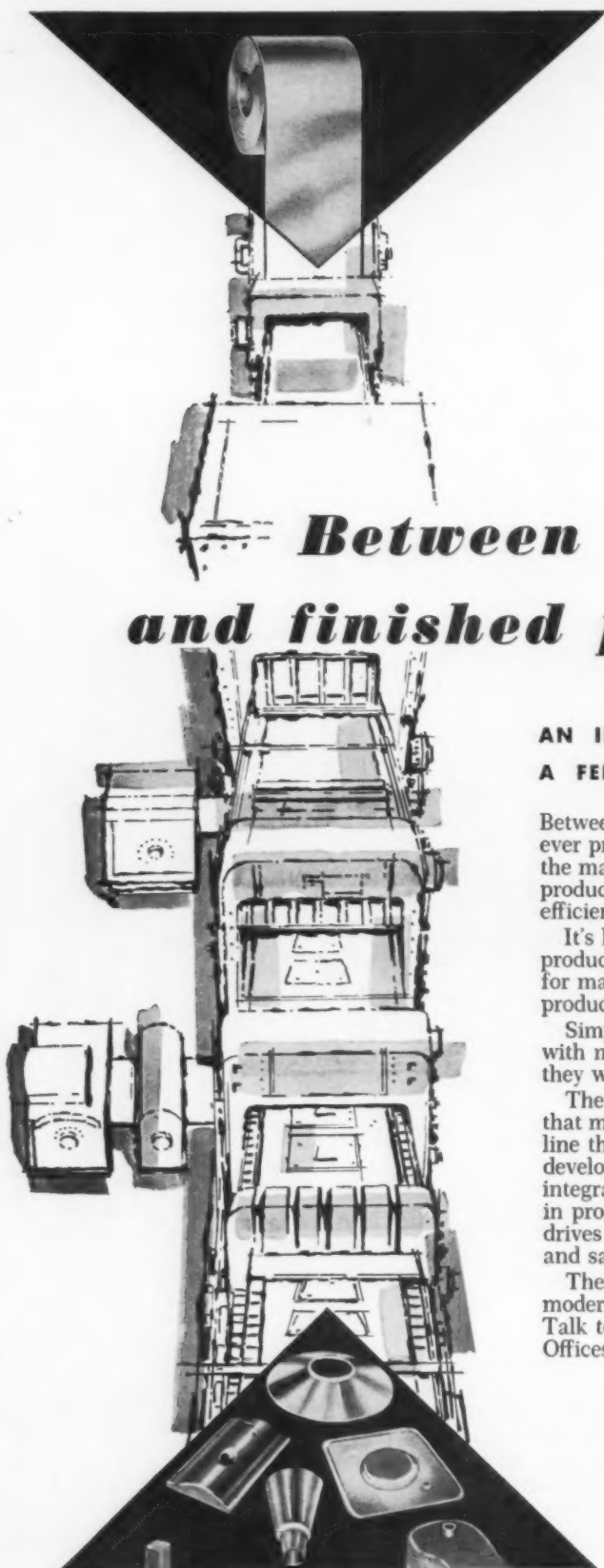
VIRTUALLY since the inception of the idea, Wean has played a major role in the successful development and manufacture of equipment for the production of tin plate by the Electrolytic process. Wean-engineered tin plate lines have established outstanding production records, but of equal importance, these same lines have continuously maintained highest product standards to meet industry's ever increasing demand for quality . . . in quantity.

Wean has engineered forty-seven Electrolytic tin lines to date. Why not avail yourself of this vast specialized experience to solve your tin plate production problems?



538

THE WEAN ENGINEERING COMPANY INC., WARREN, OHIO



***Between material
and finished part...***

**AN IDEA THAT MAKES SENSE —
A FEDERAL-WARCO PRODUCTION LINE**

Between material and finished part is the ever present problem of bringing together the machinery necessary to perform all production operations as speedily and efficiently as possible.

It's here, the Federal-Warco, this packaged production line has proved to be the answer for many of the nation's foremost production experts.

Simply provide Federal-Warco engineers with material and part information and they will develop a line to do the job.

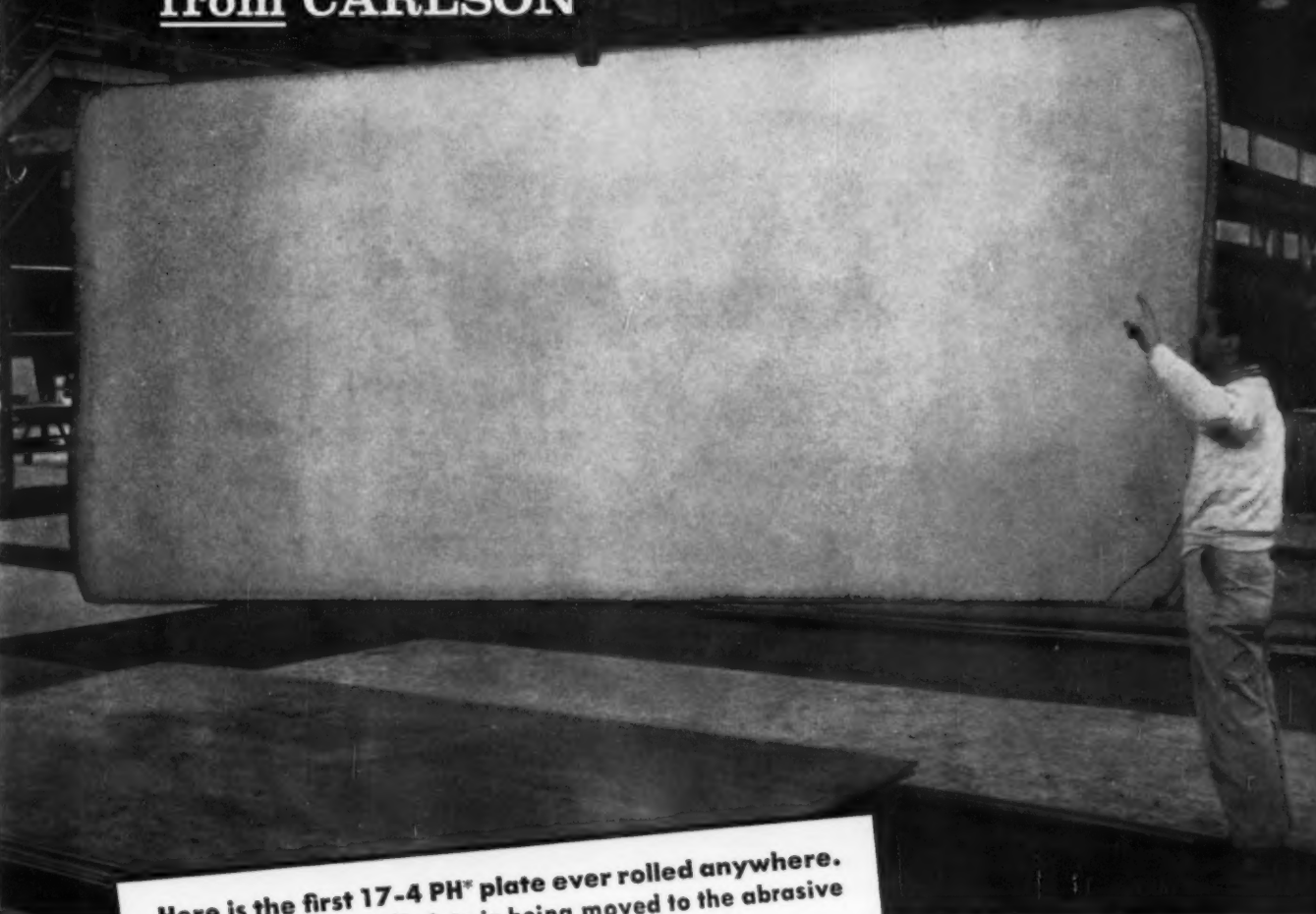
The advantages: One source responsibility that means faster, more thorough service; a line that is 100% harmonic, all stations developed especially to work in synchronization; integrated and automated handling of work in process; the possibility of utilizing common drives and bases, reducing operating costs and saving valuable floor space.

There is much more. Why not look into this modern method of production line manufacture? Talk to your Federal-Warco representative. Offices in all leading industrial areas.

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PACKAGED
PRODUCTION LINES

THE FEDERAL MACHINE AND WELDER COMPANY • WARREN, OHIO

**Now you can get
both 17-4 PH* and 17-7 PH* stainless steel plate
from CARLSON**



**Here is the first 17-4 PH* plate ever rolled anywhere.
This 179" x 79" x 1" plate is being moved to the abrasive
cutters for trimming to specified size.**

You can build equipment with either of two precipitation-hardening stainless plate grades—17-4 PH* and 17-7 PH*. Both are available at Carlson—both can be cut to your exact specifications to save delays and true-up time in your own plant.

The Armco-developed 17-4 PH and 17-7 PH grades combine ease of fabrica-

tion, hardenability, high strength and corrosion resistance. These grades have the desirable mechanical properties of the hardenable chromium types and a workability and corrosion resistance approaching regular 18-8 stainless steels. Simplified low temperature heat treatments will produce a Rockwell hardness of C40 to C50. And tensile strengths

range from 180,000 to 215,000 psi depending upon the heat treatment.

Take full advantage of our complete service in stainless steel plate and plate products. Write, wire or phone for detailed information on 17-4 PH and 17-7 PH stainless steels.

*Trade Mark of the ARMCO STEEL CORPORATION

G.O. CARLSON Inc.

Stainless Steels Exclusively

120 Marshallton Road
Thorndale, Pennsylvania

District Sales Offices in Principal Cities



PLATES • PLATE PRODUCTS • HEADS • RINGS • CIRCLES • FLANGES • FORGINGS • BARS and SHEETS (No. 1 Finish)



HIGH SPEED PRODUCTION WITH RELIANCE V*S DRIVES

Carloads of pipe are pouring out of the new Edmonton, Alberta plant of Alberta Phoenix Tube & Pipe, Ltd. This \$6.5 million installation is producing pipe at unprecedented rates.

Volume pipe production requires something special in a drive system—one that furnishes precise speed control and instantaneous motor response. A wide stepless range of speeds is provided to handle various pipe diameters and lengths, and all sections of the line operate at the same relative speed.

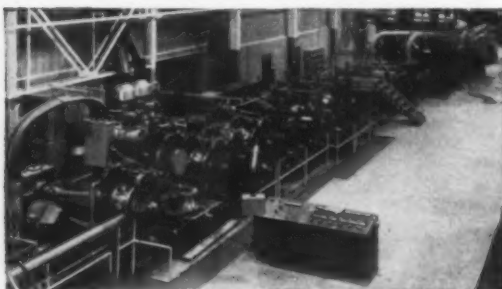
A team of Reliance Application Engineers, working with the machinery builder, built this specialized drive. This team knows the processes of the steel industry and how to handle the problems involved. Engineering knowledge, backed by the quality of Reliance products, supplied this accurate, simple-to-operate, economical drive.

The Reliance Application Engineering Department builds drives for every industry. A team of engineers who are experts on your industry's operation, stand ready to engineer and build the drive for your particular needs.

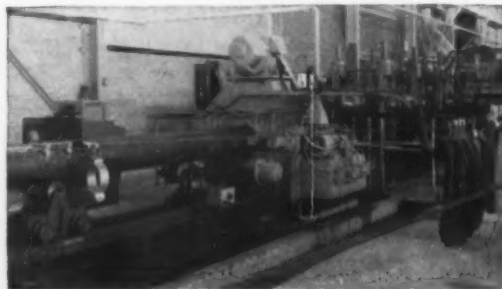
If you would like more information on this installation, write for Bulletin L-2505.

L 1641

Six Reliance V*S Drives make it possible to operate this complete line as if it were a single machine.



The welding section operator controls the speed of the entire line from this Reliance Pendant Station.



The Reliance V*S Drive on this flying cutoff automatically measures the pipe and controls the movement and speed of the carriage.



DEPT. 112A CLEVELAND 17, OHIO • CANADIAN DIVISION: WELLAND, ONTARIO
Sales Offices and Distributors in Principal Cities



typical large drill bit

Surface metal is cut away to shape drill point and spiral flutes — core is exposed to wear, structural loads

Point and cutting lips are critical to drill performance. If alloy has any weakness at center, poor cutting or broken drill will result. Mel-Trol helps to solve this problem by providing greater strength and toughness at the core. Never before have commercially available alloys been as free of segregation, porosity and centerline weakness.

MEL-TROL[®] ... alleviates a major metalworking problem—poor centerline quality in alloys

The more surface metal you cut away from an alloy steel bar, the more important uniform core quality becomes. The drill illustration above shows you why.

In alloy steels made by conventional steelmaking process, segregation, porosity or other inhomogeneities are often found along the centerline. Result: the core metal lacks the toughness of the rest of the bar, even though it may show no detectable variation.

To alleviate this major cause of poor tool quality, poor tool life and excessive rejects, Carpenter metallurgists developed the Mel-Trol process. Now, for the first time, alloys with greater uniformity from surface to centerline are being made in quantity.

The Mel-Trol process provides greater freedom from segregation, porosity and centerline weakness through a system of quality controls which play a part in every phase of the entire steelmaking process. Equipment developed specifically for Carpenter is used together with the most modern standard quality control tools. Every piece of equipment is used to its highest accuracy—nothing less.

Mel-Trol alloys are now available at Carpenter mill branch warehouses. Ask about them the next time a Carpenter representative calls on you. He'll show you how you can join the growing number of companies who are finding Mel-Trol alloys the answer to a host of metalworking problems.

Carpenter STEEL




The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Pioneering in improved specialty steels through continuing research



Youngstown cold finished bars

help build quality into
 Elastic Stop[®] nuts



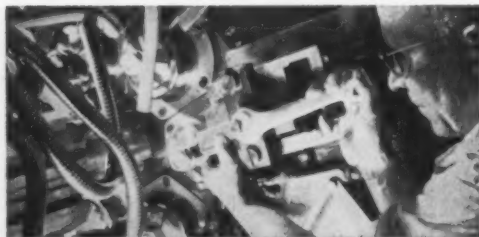
One of the most important operations in producing Elastic Stop nuts from Youngstown Cold Finished Bars. Here the bar is being cut to length to form the basic nut blank. Six spindle screws of the Automatic drill and ream the tap hole, cut and form the unclosed crown, drill and ream the insert well and finally, cut off the finished nut blank. The cold finished bar's quality must not vary as any hidden seams, pipes or center segregations could cause tooling and production breakdowns.

Youngstown Cold Finished Bars and Scrapless Nut Quality Wire play an important part in the "Elastic Stop Nut Story". They're the basic raw material used to produce these well-known self-locking fasteners familiar to almost every industry throughout the world.

These Youngstown products give Elastic Stop Nut Corporation of America long, trouble-free production runs. That's because they are quality-controlled throughout all of Youngstown's integrated steelmaking operations—from mining the iron ore to final cold drawing.

They give your operators the best chemical composition, physical structure and surface finish—a direct result of Youngstown's more than a half-century of quality steelmaking know-how. Why not make them your permanent specification for continuing high product quality and uniformity.

For more detailed information or metallurgical assistance, write or call our nearest District Sales Office today—or write directly to our General Office.



COLD FINISHED BARS
AND SCRAPLESS NUT
QUALITY WIRE



THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yaloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities





Mr. W. J. McCuen says: "Lint-free Scott Wipers are ideal for wiping glassware in our lab. They're soft enough for personal wiping—hands and faces—and yet tough enough for such jobs as wiping switchgear units, wiping machine shop lathes, wiping heavy gate valves, and cleaning paint brushes!" Perf-embossed Scott Wipers are also specially treated for extra wet strength.



People buy Scott Wipers for many reasons:

Sinclair reduces minor injuries, saves time, with Scott Wipers!

At Sinclair Refining Company, Marcus Hook, Pennsylvania, 2-ply paper Scott Wipers are used throughout the plant. They store easily in minimum space, eliminate the costs of "return and exchange," and please employees. But a big factor, in the eyes of management, is *employee safety*. Mr. W. J. McCuen, Assistant General Foreman—Storehouse, reports: "These disposable wipers have cut down on minor injuries and lost time. Employees can't cut themselves on clinging chips or foreign particles, using Scott Wipers fresh from the box!" Sinclair has seen a substantial savings in wiping material costs, too . . . with paper wipers reducing (and in some departments eliminating) the number of cloth wipers being used!



Get complete facts and figures on Sinclair as well as other case histories close to your own type of operations! Just call your Scott distributor—in the Yellow Pages under "Paper Towels." Or write: Scott Paper Company, Dept. IA-82, Chester, Pennsylvania.

Maker of the famous Scott paper products you use in your home. See "Father Knows Best" and "The Gisele MacKenzie Show" on NBC-TV.



automated

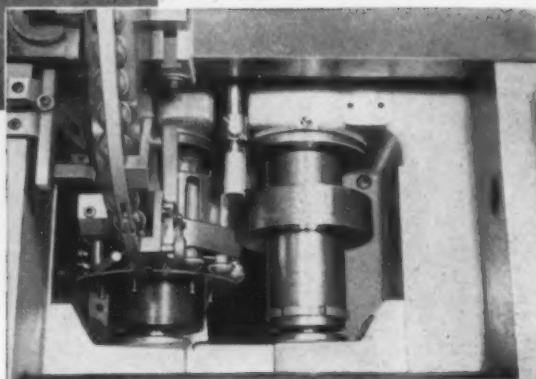


THREAD ROLLING

The automatic features of the LANHYROL Thread Rolling Machine have enabled a large industrial fastener and related parts company to automate its process for producing button head oval neck track bolts. $\frac{3}{4}$ " 10 pitch UNC threads are rolled $1\frac{3}{4}$ " in length to Class 2A fit.

One man now handles the entire operation, eliminating difficult and costly handling of hot-forged bolt blanks required in the old process. Now . . . bolt blanks are cold-formed from 800-lb. coils of hot-rolled steel wire by passing through a wire-drawer into a two-blow header, conveyed to a hopper, threaded by Continuous Rolling on the LANHYROL Machine, and ejected as finished parts into a bin for removal.

Continuous Rolling (illustrated) is one of three thread-rolling methods utilized by the LANHYROL Machine. Blanks are delivered from a hopper to an automatic, indexing-type workrest. This indexes the pieces according to a preset cycle into and away from the rolling position. There, thread-rolling is accomplished by two opposed cam-type rolling dies.



Although the LANHYROL is capable of rolling 80 track bolts per minute, in this application it is only operated to slightly exceed the production rate of the header which is 60 blanks per minute. Thread finish is considerably improved over previous methods and roll life is excellent . . . more than $\frac{3}{4}$ of a million bolts have been threaded to date with the original roll dies.

The LANHYROL Machine produces excellent threads at unequalled rates of output, and its method of operation fits well into automated processes. For information on its unusual range and flexibility, and the Infeed and Thrufeed thread rolling methods, send specifications and ask for Bulletin E-60.

494

LANDIS Machine COMPANY

WAYNESBORO • PENNSYLVANIA

AUTOMATION *



*** ADAMANT has it!**

... "automation" can be had in laying firebrick, too... when a firebrick mechanic is able to lay brick after brick, course after course... with a cement that remains plastic and smooth with each trowel-full.

Write for Bonding Mortars Bulletin #3... Yellow Pages of 'phone directory have your nearest 'ADAMANT' Distributor.



Botfield

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FOUNDED 1907

ADAMANT and other ADA products

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2351

types, shapes, sizes and finishes of Allegheny stainless in stock at Ryerson

When you want stainless fast... anything from one to 2351 types, shapes, sizes and finishes... telephone Ryerson. You can

depend on accurate processing and quick shipment from Ryerson... the nation's oldest supplier of stainless from stock.



STAINLESS SHEETS—Eleven analyses of Allegheny stainless sheets, including nickel and straight chrome types. Extra wide sizes, also, to reduce welding costs. Expanded and perforated sheets.



STAINLESS PLATES—Nine analyses, including plates to Atomic Energy Commission requirements and to ASTM specifications for code work. Also extra low carbon types for trouble-free welding.



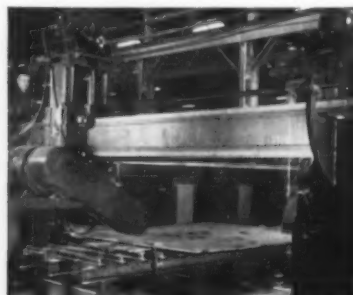
STAINLESS BARS AND ANGLES—Eight types, including rounds, squares, flats, hexagons and angles. Free-machining bars with both analysis and mechanical properties controlled for best performance.



STAINLESS PIPE AND TUBING—Light wall, standard and extra heavy pipe, ornamental and regular stainless tubing. Also screwed and welding fittings and Cooper stainless valves.



STAINLESS CIRCLES, RINGS, SPECIAL SHAPES—No matter how intricate, we can flame-cut practically any shape from stainless steel plate. One piece or a thousand.



TRUE-SQUARE ABRASIVE CUTTING—Stainless plates up to 12' x 25' cut absolutely square on abrasive disc machine. Length and width tolerance plus or minus 1/32".

Principal products: Carbon, alloy and stainless steel — bars, structurals, plates, sheets, tubing, industrial plastics, machinery and tools, etc.



RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Swing Back to Nickel

Easier nickel supplies have producers expecting the return of many old customers in such areas as alloy and stainless steels, copper-nickel alloys, and nickel plating. With ample supplies, nickel platers might hold much of the automotive brightwork market despite competition from stainless and aluminum. Growing markets for nickel plate are the chemical and electronics industries.

Porcelainize Copper Sheet

Copper roofs, long known for durability, can now offer brilliant color effects through the use of permanent, porcelain coatings. First use of these colorful ceramic-clad roofing sheets is said to be scheduled for a new church edifice in a New York City suburb.

Electric Auto Comeback?

Electric automobiles may be back on the market by 1960. A syndicate is seriously planning development of a small, plastic bodied electric model for the second-car market. The group also has some unique marketing plans in mind. Electric-utility companies are said to be showing a considerable amount of interest in the venture.

Rockets to Move Faster

Special electromagnetic equipment will triple rocket ship speeds, it's said. The exhaust gas stream will be seeded to create a magnetic field in which current will be induced to flow. The added electromagnetic force will speed the gas flow. Researchers say this technique could be the way to send a rocket ship beyond the gravitational pull of the earth.

More Oil Well Pipe?

The oilfield outlook is a lot brighter than it was just a month ago. Cold weather has cut stocks of heating oil by 29 million barrels in just 30 days, and overall stocks of oil are down by 6

million barrels. Pipe makers are hopeful that the spurt in consumption will be reflected in more well drilling. If so, this would stimulate a wave of orders for oil country seamless.

Close-Tolerance Forgings

A new rapid-step forging technique is attracting attention. Developed in Germany, the precision process does progressive forming in a series of stations. The blank indexes through successive dies and emerges nearer to part size than one produced by conventional hammer or press forging. The high-speed process is said to be especially good for high-strength aircraft and missile parts.

Discount Hawaiian Bauxite

Surveys and tests of Hawaiian bauxite show these deposits would only be economical in an emergency. Hawaiian government officials are trying to promote refining of the ore either in the islands or on the U. S. mainland. Major aluminum producers are skeptical of the idea.

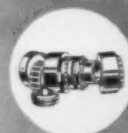
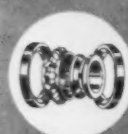
Hope for Better Roads?

Hole-dodging motorists will welcome the news that properly processed open hearth slag makes a better aggregate for asphalt paving mixes. The stability of slag mixes tests 10 to 20 pct higher than those obtained with crushed limestone or gravel aggregate.

Coating Fights Corrosion

A combination surface treatment and prime coat results from either a brush or spray application of a new, low cost material. Designed to protect both steel and nonferrous metals, it's said to passivate surfaces completely, eliminate rust, become insoluble and nonconductive. It forms a complex metallic-phosphate which becomes part of the substrate, and is said to make a firm bond with all organic coating systems.

MESSINGER *Roller* BEARINGS

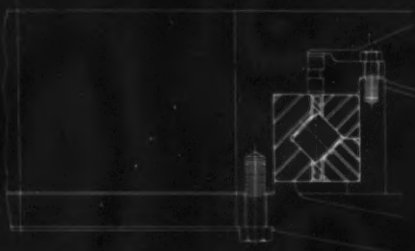


The Versatile **"X" BEARING**

Takes thrust load in either direction, with radial load and overturning moment, and can take them all at one time. Each bearing does the work of three ordinary bearings. Sizes as small as your hand to twelve feet or more.

Why Used...

The patented "X" Bearing will carry a greater load than a ball bearing in a given space, or carry a given load in a smaller space. The deflection under load is much less with a roller than with a ball, and therefore the bearing will have greater accuracy, rigidity, and reduced axial play. Longer span of useful life is a result of greater contact area of the rollers.



Military Services...

Radar screens for the nation's ground observer and detecting stations revolve around the clock on Messinger "X" Bearings. With their help, glass for our jet fighters is ground flat and free from distortion. They are used in gun mounts for AA artillery, requiring unflinching accuracy and speed, and for our largest naval vessels where massive weights must be supported and handled quickly and easily. The diagram above shows an "X" Bearing applied to a vertical axis propeller.

Other Uses...

They provide improved productivity in steel mills and paper mills, on work rolls, levellers, suction rolls, press rolls, calender rolls, and in similar installations. Rock crushers and boring mill tables are other typical applications. Thousands of "X" Bearings are in service wherever critical and enduring accuracy is of paramount importance.

Like all Messinger Roller Bearings, "X" Bearings are made to the highest standards of quality and craftsmanship. Their proven advantages warrant your consideration. Write for complete information.

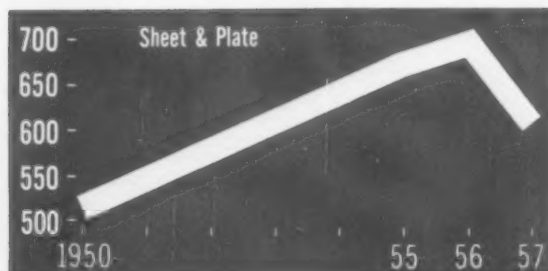
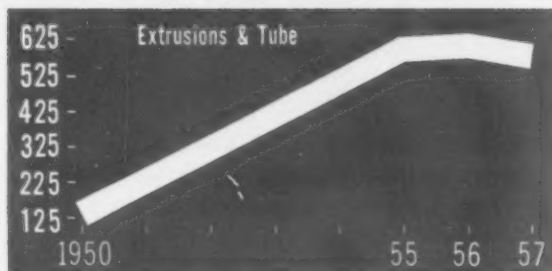
Smoothing Industry's Pathway  *...for Nearly Half a Century*

MESSINGER BEARINGS, INC. D STREET ABOVE ERIE AVE. PHILADELPHIA, PA.

RADIAL, THRUST AND COMBINATION ROLLER BEARINGS • BALL BEARINGS

Why Aluminum Industry Is Creating New Markets

After the Initial Upsurge, a Leveling Off



Shipments in Thousands of Tons

Aluminum Aims for Big Markets

With demand sagging, the aluminum industry is making extensive marketing plans.

It's concentrating its heavy guns on the big markets.

The criteria is potential tonnages rather than current sales.
—By F. J. Starin.

■ Less than a year ago the aluminum industry was hard-pressed to meet demand. Despite a rapid buildup in capacity—from 718,000 tons in 1950 to nearly 1.7 million

tons last year—it was a sellers' market.

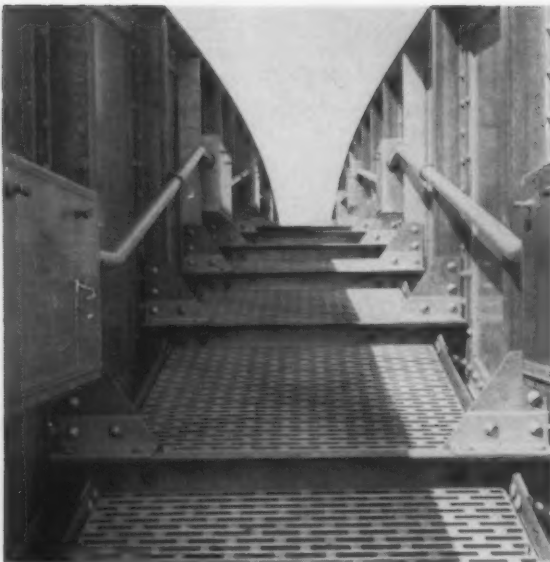
Today, all this is changed. The buyer is in the driver's seat. Aluminum companies are still confident of their long-range prospects, but the immediate picture is anything but bright. The "Big Three" — Alcoa, Reynolds, and Kaiser — have shifted the emphasis from production to marketing. Target dates on some construction projects, some already underway, have been moved back.

Marketing Carries the Ball—But the aluminum people are not sitting

on their hands. They're gearing up for one of the most intensive and far-reaching marketing and promotion programs in their history. Whole departments are being reshuffled, new concepts have come into being. The producers have traded their shotguns for rifles—they're concentrating on the markets that have the greatest potential.

Marketing and sales staffs of the major producers have been upped 25 to 30 pct. But even so they are still considered too small to go after the problem on all fronts.

Studies have shown that 7 pct



FOOTHOLD: The industry is trying to sell structurals as well as accessories for bridges.



COOPERATION: Reynolds and Airco worked together on a way to continuously join aluminum pipe.

of aluminum's customers account for 87 pct of sales. The new approach—concentrate men, money, and effort on the leaders in the markets with the biggest potential. This has been christened "major account approach" by the industry.

Breakthrough—The overall goal is a "breakthrough." Example: An extrusion sold to Cadillac in 1954 prompted much more use of aluminum trim in autos. Now, Doehler-Jarvis, assisted by Kaiser, has gone as far as tooling up to produce an aluminum auto block.

What are the target markets? Passenger cars, building and packaging, are considered to have vast untapped potential despite the fact that they are today's leading markets for aluminum. Expected to enter the tonnage class are oil and gas, marine, and other forms of transportation.

Organization Changes — The shifting market condition called for basic organization changes. Kaiser revised its setup from stem to stern to get better coordination. Reynolds revamped to get more emphasis on building products, and added to its Detroit staff. Alcoa set up a new division to go after residential building markets, which many say isn't growing fast enough.

Top Level Selling — Supporting the marketing men are either formal or informal executive sales staffs, with top men "soft selling" on upper management levels. Design, styling, and research staffs have also been expanded to support promotion programs.

In many of the target markets, the king-sized rolling and production equipment installed in the last few years is making a difference.

The marine industry is showing more interest in larger plate. And king-sized plates may play an even bigger role in expanding the gas and oil market.

Potential Market—One company is experimenting with aluminum tanks and tankers for moving and storing liquid methane. This is a low cost fuel available in large quantity in some parts of the world, not at all in others. It must be kept under pressure at -320°F .

If the experiment proves out several more companies are poised to jump into this field. The aluminum industry expects to supply metal for from 50 to 100 ships, at one million lb per ship; also for storage tanks at source and destination.

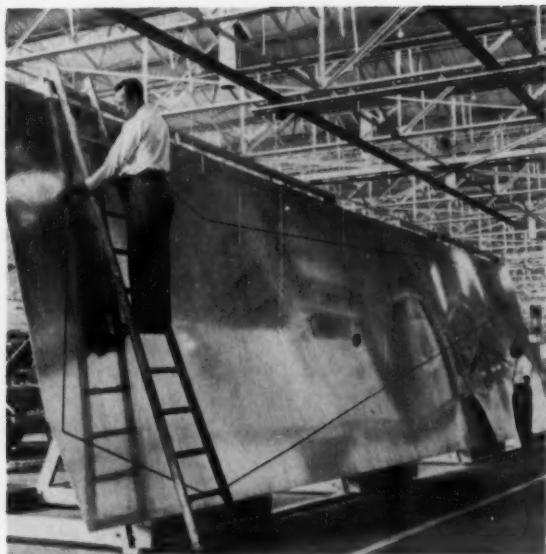
Prestige Selling — The industry reason that if the consumer wants

it, the fabricator will have to make it.

The Reynolds seal, designed to keep the public aluminum conscious, has been reproduced on packages going into the home and industry about 17 billion times. The Do-It-Yourself aluminum program was not designed to make money. It was the second step in making people familiar with aluminum.

Market Approach—The potential of most major markets is still untapped to the extent that a successful campaign by one producer inevitably sells some of his competitors' metal. Product managers try to supplement, not compete with plans of a competitor.

In the building field, considered to have the best potential, the three prime producers have different approaches. Alcoa has the Carefree Home project. It jams all possible uses into a single sample dwelling. Reynolds shoots for architects with (1) a two volume set of books on aluminum in modern architecture, a project that cost them \$500,000, and (2) the R. S. Reynolds Memorial Award — \$25,000 annually to the architect who uses aluminum most skillfully.



BIGGER: Wider sheet and plate is helping Alcoa keep its foothold in the aircraft industry.



DRAMATIC: The geodesic dome is Kaiser's way of focusing attention on aluminum for building.

Kaiser is plugging the geodesic dome. It is not currently applicable to homes, but its dramatic appearance (most are gold anodized) and new erection techniques focus attention on the possibilities.

Right now the building people are lining up for a push on a new product — an insulated aluminum panel that is load-bearing.

Cooperation — Working with other industries is becoming more commonplace. Alcoa has already gotten together with National Homes to build an experimental house with the new panels. Reynolds worked with Air Reduction Corp. to develop a welding machine to join aluminum pipe for oil and gas transmission.

The packaging market is in the throes of a revolution. Foil, once the almost exclusive bailiwick of one company, is now a battleground in which all producers are making headway.

Perhaps the best long-range aluminum packaging market is cans. But there is a difference of opinion on the approach. Alcoa does not yet consider the aluminum can economically feasible. Reynolds is very enthusiastic, but draws the line after supplying metal and know how. Kaiser offers extensive

technical assistance to canmakers, but is making its own cans as well.

Structural Outlook—The current situation also has aluminum scrambling for structural markets, where once they paid little serious heed. The big difficulty, say product managers, is that aluminum won't work unless it is considered in design. It can't be substituted for steel.

The industry has gotten together on this one, hoping for a breakthrough. The first aluminum girder type highway bridge will be constructed near Des Moines, Ia. It is being sponsored by the Iowa State Highway Commission and all three of the major producers.

Meanwhile they are going after electrical substations, bridge accessories, and minor buildings.

Despite the current excess of supply, it is hard to find a pessimist in the upper strata of aluminum management. The industry is talking about an increase in demand, in less than 10 years, of a billion or a billion-and-a-half lb.

Look for Balance—On the short haul, David Reynolds, executive vice president, Reynolds Metals, sees the possibility of close to a balanced market in 16 months.

Kaiser's R. L. Sheneman, man-

ager of marketing research, says. "One needs only to look at the fundamental needs of the world—shelter, food, transportation, communication—to see where the great demand for aluminum will come from in the future."

Men on the Cover

Alcoa's top marketing men gather with William S. McChesney, manager of industry sales, (left foreground). Clockwise from Mr. McChesney, H. P. Bonebrake, manager of chemical products; M. C. Schoetz, manager of architectural sales; William Turbeville, manager of industrial foil sales; William S. Ellis, manager of residential building products; Charles G. Kiskaddon, manager of automotive sales; and F. J. Close, manager of market development.

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Behind Linepipe Market Collapse

Court Ruling Knocks Million Tons Off Order Books

Decision hamstrings gas pipe line operators, forces shelving of big linepipe projects.

Appeal carried to Supreme Court. Congress may get into act.—By G. J. McManus.

■ An obscure court decision last November knocked one million tons off steel shipments in 1958.

The ruling came from a court of appeals in Washington, D. C. In a case involving the City of Memphis and United Gas Pipe Line Co., the court held that the usual method of granting rate increases to pipe line operators was illegal.

A Body Blow—For owners of natural gas pipe lines, the ruling was a body blow. It meant they could be held liable for refunds totaling over \$200 million. It meant their revenues could lag behind costs in future years. It meant they had become unattractive risks for utility investors and other money sources.

As a result construction of gas lines came to a screeching halt. And since 95 pct of all linepipe over 16 in. goes for gas transmission, steel mills were hit hard and fast. Two jobs, totaling 550,000 tons, were shelved. One mill had four months' production wiped off its books.

Programs Cut — Columbia Gas System, Inc., says it may slash its \$89 million construction program if the Memphis decision is upheld. The program covers facilities to distribute an added 310 million cu ft of gas a day. Of this amount, 235 million cu ft was to come from the Southwest and may not now be available.

Regarding the Memphis decision, FPC General Counsel Willard W. Gatchell says this: "... it has created a condition of uncertainty that

has had a demoralizing effect on pipe line expansion for new and growing communities."

How Steel Was Hit — Direct losses may top one million tons, says one mill. In addition, a wide range of related projects are stalled. At one mill, utilities have cancelled or deferred 27,000 tons of pipe 16 in. or smaller. The pipe was to go into distribution systems. Now, there will be no new gas to distribute.

The whole problem arises from the creaky machinery for rate regulation. Under the Natural Gas Act, the Federal Power Commission must pass on all new rates of pipe line operators. It takes the commission two to three years to investigate and pronounce on a new rate.

The Outlawed Approach—To get around this long delay, there is provision that new rates may take effect on a tentative basis six months after they are filed with FPC. In this situation, the supplier posts a bond and must return any part of an increase

that is subsequently disallowed. Most provisional rates have eventually been approved in large part.

In 1956, the Supreme Court decided this short method could not be used in cases where rates for gas supply had been specifically fixed by contract. (United Gas Pipe Line Co. v. Mobile Gas Service Corp.)

Court Overrules FPC—Later that year, FPC ruled that this prohibition did not apply in the Memphis case. Like most other gas supply agreements, the Memphis contract provided that charges would be paid according to current tariffs of the supplier. FPC said that new tariffs could be installed using the six-months procedure.

This ruling was overturned by the court of appeals last November. New rates could only be installed with the consent of the customer or with full, formal approval by FPC, said the court.

Appeal Taken—FPC along with three pipe line operators then asked

How Memphis Case Hit Linepipe Market

Shipments of Linepipe in Thousands of Tons



Source: AISI

the Supreme Court to review the lower court's finding. On Feb. 4 of this year, the high court agreed to look over the case. A hearing has been asked for April 28.

The Supreme Court is due to say on March 3 whether it will hear the case this term. If it does, a decision is likely by June. If the court does not hear the case this term, the matter will probably drag on into 1959.

May Approach Congress—If the high court rules against FPC and the operators, action will be taken to secure "remedial" legislation. Chances of a new law this year would not be good at best and recent displays of oil dollars in Texas have not improved the political climate.

Without either a favorable ruling or a new law, pipe line operators have only two possible courses. They may negotiate new rates with customers or they may go through the long approval process. Since the Memphis decision one supplier has worked out compromise rates with its customers. This may be a temporary answer but as one oil man points out, you can't stay in business if your customers have the right to veto any price increase.

Poor Timing—Since the Memphis case hit just about the time of the general business slide, it may be getting the blame for some cutbacks that would have come anyway. For crude oil and oil product lines, the future role of imports is causing concern. Financing may be a problem in some cases.

But the November decision has hurt, and steelmen will tell you it couldn't have come at a worse time.

Little Bidding For Defense Business

Private negotiation, rather than private bidding, continues to account for the lion's share of Defense Dept. contracts.

New Pentagon figures show that 85 pct of the dollar value of Military purchases in the July-September, 1957, quarter were negotiated.

New Stampings For A New Ride

Chevrolet produces its air suspension parts on newly developed equipment.

Multi-step transfer press turns out draw depth unheard of a few years ago.

■ When the auto industry comes up with a new development, it generally requires special automatic equipment to produce it in the high volume runs associated with the industry.

That is now the case with air suspension, which this year is making inroads into the passenger car field. It's estimated that not since the automatic transmission has a mechanical improvement created the need for so much newly designed equipment.

For Deep-Draw—For Chevrolet's Level Air ride, giant transfer presses are helping solve the high-volume problem in stamping out the deep-drawn air spring parts.

One example (see photo) is the Level Air spring reservoir. It is stamped in 12 steps, with the finished 6½ x 7-in. reservoir developing from the original blank measuring 13¼ in. across.

As the metal progresses from the original blank, it is formed into a container with a two-level top, a side valve entry, with the diameter and depth giving it the appearance of a coffee can.

Well Planned—The new shaping processes result in curvatures and depth of draw that were unheard of only a few years ago. Chevrolet, which probably leads in the volume of air springs, conceived the idea of the large presses 18 months before introduction of 1958 models.



STEP-BY-STEP: These are the 12 steps by which a Chevrolet transfer press stamps out a part for new Air Level spring system.

The parts are produced in a special department of the Livonia, Mich., plant.

In stamping the piston for the air suspension system, a 11½-in. blank travels through six stampings in a transfer press. At conclusion, the hub measures 5 in., with the rim at the open end measuring 4 in.

Will Management Get the Upper Hand?

Important contracts covering thousands of industrial workers in key industries will be up for renegotiation this year. With business in a cyclical downtrend, it looks as though bargaining over new contract terms will be the toughest in years.

Some managements, faced with falling sales and profits, seem to be in a mood to make some demands of their own. Some unions, including the aggressive United Auto Workers, seem less sure of them-

selves, are shifting from one foot to the other as negotiations near.

The big question is whether business uncertainty and union leaders' determination to somehow get more for their members will result in a head-on clash and a sharp upturn on the strike chart.

Here are some of the contracts that will expire this year, and the companies involved:

Automotive — General Motors, Ford, and Chrysler. Contract termination date: May. Workers affect-

ed: 650,000.

Aircraft — Douglas, North American, Bendix. Contract termination dates: March and August. Workers affected: 100,000.

Farm Equipment — Harvester, Caterpillar, and Allis-Chalmers. Contract termination dates: July and August. Workers: 65,000.

Steel industry contracts do not expire until June '59. Workers will receive an automatic wage and fringe boost of at least 13¢ an hour July 1.

Management Takes the Offensive

Unions will find 1958's contract a tough one to negotiate. For the first time in years, labor has lost the offensive.

The labor leader who wants to close a 1958 contract based on 1957 business is in for a big surprise. Things have changed.
—By K. W. Bennett.

■ For labor's top echelons, the heat is on. It's coming from three burners and, labor relations men say, each will get hotter this year.

First, management is digging in its heels. The management war cry has switched from "production at any price" to "cost reductions, or else."

Will Take a Strike — A labor contract negotiator recently announced: "We have 78 contracts. Only 20 of these have cost-of-living escalators. We're going to weed out escalators as swiftly as we are able. They are a luxury we can no longer afford."

Says another negotiator who has

already written his 1958 contracts: "We've closed nine contracts in recent months, all without pay increases. We had two minor strikes, but our labor force is back at work. We're better off than if the strikes hadn't happened."

Poor Press for Labor—The fire under burner No. 2: Labor leaders haven't looked well in the press, even to their own followers. The McClellan committee will be active in 1958 and they could look even worse.

On the 1958 agenda is a thorough investigation of the Kohler strike; further delving into the affairs of the operating engineers; more work on the carpenters; examination of secondary boycotts and jurisdictional disputes; more work on racketeers in the unions.

Dissatisfaction Within — Heat from burner No. 3 comes from rank-and-file union members themselves. The switch from a four-day week demand to the UAW's profit sharing was not popular, for example.

Glimmerings that a short week as a bargaining point would be revived brought up these points: The rubber workers abandoned a 36-hour week and went back to a 40-hour week. A poll of paper workers killed a short week proposal. Other polls indicate workers are less interested in shorter weeks than securing the job they now hold.

Management's Side — Adding more heat is the fact that labor leaders, fixed in the spotlight by congressional investigation, now show keen sensitivity to public opinion. At the same time, management has begun to state its case publicly, as labor leaders have done for years.

An automotive executive points out: The willingness of management to explain its stand to the public makes big labor uncomfortable.

He indicated that he expected nuisance strikes and slowdowns to occur in one or several of his company's divisions. He implied that

it is more than coincidence that wildcat strikes invariably follow a public statement by a company official referring to labor problems.

Summing Up—Labor relations men attending the American Management Assn. spring labor negotiations conference in Chicago last week summed up the labor outlook this way:

1. There will be little action by Congress, in an election year, to slap controls on labor.

2. The McClellan committee has union leaders worried. Even the most cooperative are backing off. Profit sharing and the four-day week were attempts to confuse the issue and there will be more trial balloons of this sort. Negotiating companies are already being hit by demands for SUB, profit sharing, less outside sub-contracting work, less work simplification.

Job Security Important—3. The downtrend in the economy has put labor leaders on a hot spot in itself. Any demand they make that endangers job security will be questioned by union membership as never before.

4. Despite these points, labor leaders will come to the bargaining table seeking to negotiate, in many instances, a 1958 labor contract based on 1957 business levels.

5. Management is taking its case to the public and its employees. Many simply mail copies of the annual report to employees. They brief supervisors and foremen regularly on the current labor contract, on what's happening during labor negotiations, and, finally, on the provisions of the new contract.

Taking a page from the shop steward's book, they now see that front-line management is just as conversant with labor problems and management's viewpoints as is the union steward on his side.

6. Union members know that, if they lose the job they are on now, there's little work available anywhere else. They are in no mood to throw in the paycheck, even if it's shrinking.



SPEED COUNTS: American Can Co.'s fast production rate of 450 per minute is helping the carbonated beverage can compete economically.

Soda Cans Catch On

■ "It could be the beer can all over again," said a can company representative. He was talking about sales of carbonated beverage cans, which are really starting to hit stride after a slight drop in 1956.

A consensus of the industry indicates total sales for 1957 were about 350 millions cans, compared with 314 million in 1956.

Future Looks Good — Industry executives say everything points to a bright future. A good sales estimate for 1958 is 500 million cans. The beer can jumped from 650 million to 776 million cans sold at the same point in its growth.

Nineteen of the leading 25 soft drink processors are now using cans. Some, like Coca Cola, use cans for overseas shipments. However, Coke is ready to test cans domestically for vending machines.

Areas for Improvement — The last comprehensive study, made a

few years ago, indicates cans account for less than 1 pct of the soft drink market. A breakdown in statistics indicates definitely where the biggest room for improvement lies. For instance, in supermarkets which carry an extensive line of canned soft drinks, the cans account for about 17.5 pct of total soda sales. But vending machine business is almost non-existent.

A number of vending machine makers report they are in the process of developing machines for canned soft drinks. And the processors will get a boost from canners in this direction.

Target—Current goal of the soft drink canners is 10 pct of the total market.

The soft drink field has not been touched by the aluminum can yet. Most canmakers say it won't be in the foreseeable future. The economics are still too far out of line, they say.

How to Meet Business Changes

Tighten Corporate Weak Spots, Expert Warns

Management troubles during an economic squall stem from a handful of basic areas, Richard Paget tells AMA conference.

**Keep your organization flexible, he says, and get all the facts to make the correct decisions.—
By G. G. Carr.**

■ Most business men agree with the classic maxim that all is change. They are sharply aware that the best-laid business plans must be scrapped when an unexpected event upsets the economic applecart.

The future, like the weather, is tough to predict and even tougher to control. In either case, the only thing to do is adapt to it. Sound management makes sure it has a business umbrella against economic rainy days. Speakers at the American Management Assn. conference on meeting changing business conditions stress that the time to buy the umbrella is before it starts to rain.

Where Weakness Starts — This doesn't mean, argue the experts,

that management must nervously try to plan for every conceivable catastrophe. It does mean that sound organization assumes that change is inevitable, and plans should be made to ride out the storm no matter from what quarter it may come. Conversely, a poorly managed company can find trouble in the lightest economic drizzle.

It's human nature to assume that nobody's troubles are like our troubles, but business experience shows this usually isn't so. Richard M. Paget of Cresap, McCormick & Paget, New York management consultants, reports that his firm has found that virtually all corporate soft spots stem ultimately from weaknesses in one or more of a handful of basic areas.

Know When to Bolster — First, says Mr. Paget, is the attitude and policy of top management. Too often, management is timorous and negative. When trouble comes, the first reaction is to cut costs, stop spending money no matter how valuable the purchase could be. Hard times are no inducement to throw

money around lavishly, he agrees, but sound management, no matter how conservative, must recognize that poor times are the right time for judicious bolstering of a company's strong points. Sound policy calls for careful but forceful spending rather than relentless but penny-wise cost slashing.

Controlled Optimism Best — But the best management is useless if its hands are tied by a weak board of directors. Paget admits this is a delicate area, but stresses that management must continually press for board members who are equipped and motivated to push the company's long-range best interests.

Business likes to picture itself as careful and cautious, but too often proceeds with a reckless optimism that could be described as excessive. Optimism is comforting to have around, but this psychology must not dominate sales and financial planning. Proper forecasting must recognize that business can just as easily go down as up, and that present good times are no guarantee of a rosy future. Properly administered, small doses of pessimism can be a valuable asset, Paget comments.

Where Do Hard Times Hit Hardest?

■ Business experts find that difficulties in meeting changes in business conditions are often traceable to a handful of basic causes. Here are the ones they single out for special attention:

1. Negative and defensive top management.
2. A poorly experienced and poorly motivated board of directors.
3. Unrealistic, rashly optimistic

sales and financial planning.

4. Organizational structure either far too rigid or far too loose.

5. Lack of a coherent executive development program.

6. Inadequate and inaccurate facts and forecasts.

7. Infrequent and superficial reviews of costs.

8. Rigid and narrow marketing strategies.

Keep Organization Flexible — The same reckless optimism can also show up in cheerful neglect of organization. The company without a proper manning table finds itself coming apart at the seams when business slumps. But the opposite extreme is just as dangerous. Organizational structure must be flexible enough to permit fast adjustments to changed conditions, and the overly-rigid structure deadens vitality.

Companies which ignore proper organizational planning are also

likely to overlook executive development, Paget warns. Loss of a key man hurts at any time; in bad times it hurts much more. And it's too late to start developing a man when you need him.

Get Reliable Facts—Of equal importance and frequency is failure to have adequate facts and figures on which to base management decisions. This is another key area where weaknesses can show up alarmingly, cautions the management consultant. Accounting and market research studies must be reliable, and their scope must be broad. Consultants frequently find that management is afraid to spend the money for proper figures and forecasts. But the cost of poor ones always proves to be more than the cost of good ones.

No matter how good the cost figures once were, they must be reviewed periodically to make sure they are still valid. Many a firm has learned too late that its costs were somewhat higher than its sales price. Reviews must be both frequent and searching; it's not enough to apply a percentage increase across the board.

No matter what happens in the plant, the product must still be sold. And an inflexible marketing strategy is a final and major cause of trouble. Ultimately, all business change is a market change, and the company which can't switch sales plans to meet changed conditions is in serious trouble, Paget concluded.

Second Sendzimir

The Wallingford Steel Co. has added a second Sendzimir mill to its Wallingford, Conn., works.

The mill will produce precision strip in widths up to 27 in. and thickness down to .001 in., including thin gage strip for special applications such as turbine engines, missiles, and aircraft components.

The new mill is equipped with X-ray gage equipment to control thickness automatically.

Wire Fabric Rush?

■ Welded wire fabric makers, unlikely many other steel product producers, are not resigned to a moderate year in 1958. In fact, they see a good chance of being caught up in a sales rush.

Fabric producers look for a delivery scramble this spring and summer because of: Mass price hedge buying with fast delivery specified to beat price increases expected after steel labor costs go up in July. Increased roadbuilding on the national highway program. Pent-up building demand stemming from the 1957 concrete strike. Wire mill lead times lengthened by batch production.

Less Lead Time—Usually at this time of year, releases against orders for welded wire fabric for highway construction use start coming in at a fair clip. This enables fabric mills to get a head start, plan their schedules for best efficiency, and generally get ready for the hectic construction season.

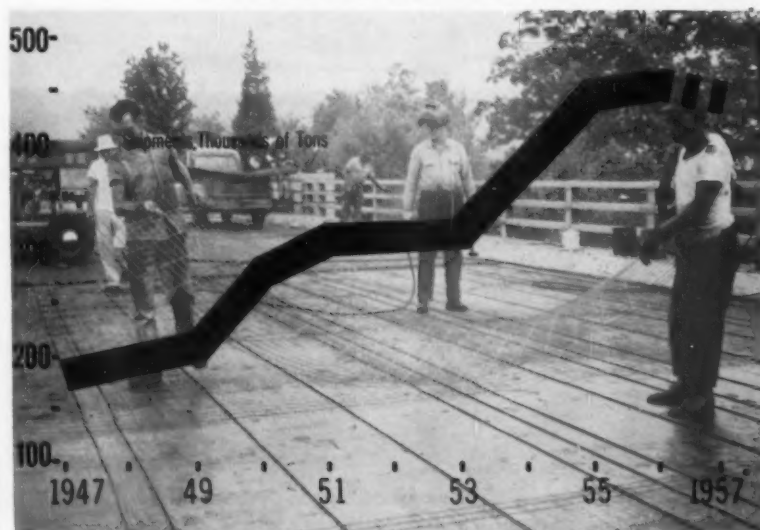
However, this year state highway construction departments, apparently convinced that off-the-shelf

delivery is here to stay, have held releases to 50 pct of last year's figure. And they've done it despite pleas from fabric producers, and in the face of a probable step-up in the national roadbuilding program. Wire producers have approached various state highway construction departments to order and accept delivery ahead of date (and pay on delivery, of course) and found few takers.

Batch Production Difficult—Customers have formerly taken delivery of the wire on a year-round basis because of fear of being caught short. Their action this year is something new.

Stocking Not Feasible—Change-over times between styles run from a minimum of 2 hours to an extreme, but not unusual, 36 hours. On some types, output is limited to 6 tons per mill turn so an inrush of orders can pile up fast. In addition, because of the seasonal nature of the business, labor turnover is a big problem. The combination of all these elements gives producers the jitters.

No Collapse Expected Here



Source: Wire Reinforcement Institute

Britain Steps Up Export Effort

Seeks World Outlets for New Steel Capacity

Domestic orders are falling off in Britain, but steel mills aren't slowing down.

Despite prospects of hot foreign competition, they are counting on unloading their excess capacity abroad.

■ British steelmakers will be exploring foreign markets more intensively in the months ahead.

With little prospect of increased domestic demand in 1958, steel men in Britain are banking on expanded exports to fill the gap between declining orders at home and rising capacity.

British steel capacity jumped from 25 million tons in 1957 to 26.3 million tons in 1958. Last year, the United Kingdom's steel production hit a new record of 24.3 million tons, 5 pct over 1956.

Hard Work Ahead — But the British steel men expect that in-

creasing their share of the export market will not be easy. The world market for steel stands under the shadow of uncertainty of business conditions in the United States and the possibility of further drops in commodity prices.

Moreover, other European producers can be expected to press export sales in the coming months. In the European Coal and Steel Community, new orders placed by non-Community countries have fallen off substantially, putting a strain on minimum export prices recommended by the European Steel Export Entente.

Domestic Restrictions — British steel men must also face the possibility that U. S. producers may seek export outlets. However, they remember that the U. S. did not export to any large extent in the 1953-54 recession.

On the home front, the Britons see little chance of any marked up-

turn in the use of steel before the closing months of 1958. Consumption already is being affected by the Government's economy measures curtailing capital improvements. And steel inventories in Britain are at a high level.

High Rate Continues—Still, the decline in the number and volume of orders being received by British steel mills is not yet reflected in production figures.

Steel production in January averaged 456,000 gross tons a week compared with 466,000 tons a week in January, 1957. The slight decline was attributed to a slabbing mill breakdown in a major plant and the holiday season.

Strong Auto Market—While capital equipment builders are not buying as heavily as before, private spending on consumer durables is at a high level in Britain. Demand for cars runs high. Stimulated by a large influx of export orders, the British auto industry is expected to make considerable demands on sheet.

This offsetting factor is expected to keep deliveries of steel to the domestic market from falling more than 5 pct.

In spite of these uncertainties, the British steel industry expects to top its 1957 production record.

Canadian Pipe Mill

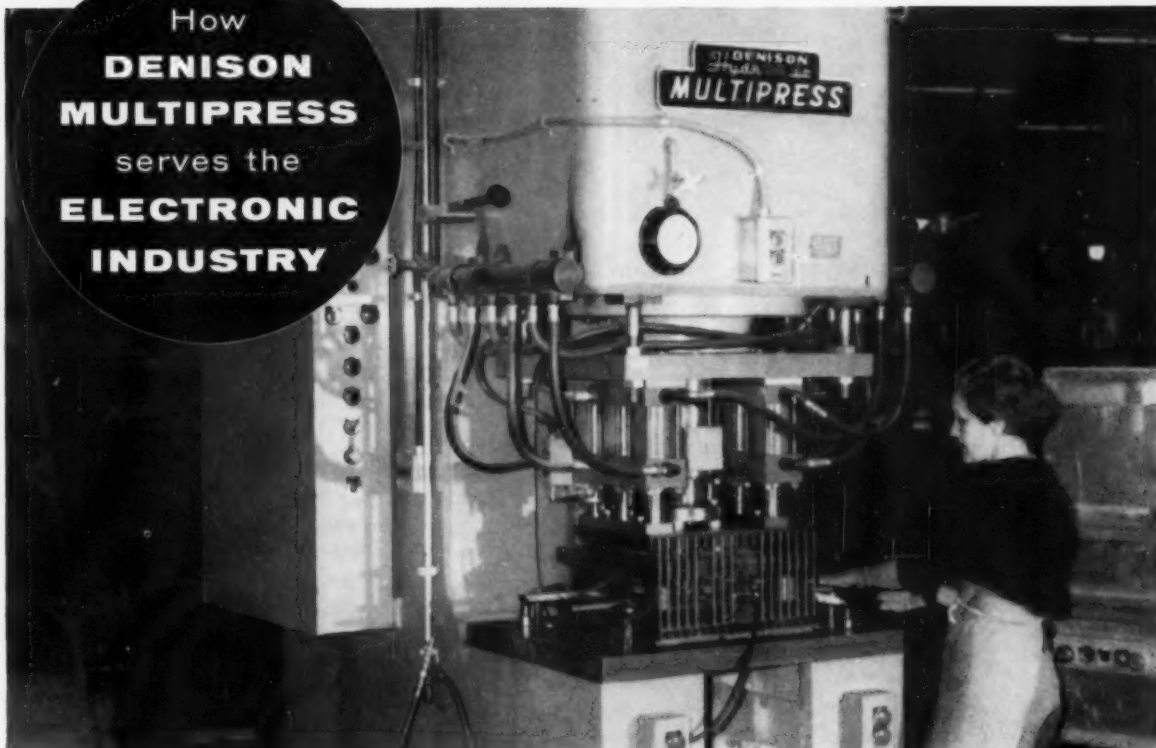
Page Hersey Tubes Ltd., Welland, Ont., is completing a new \$5 million steel pipe mill, to be ready for production next month.

It will be the company's eighth pipe and tube mill and the second to produce steel pipe by the electric resistance method. It will produce pipe from 2 $\frac{3}{8}$ in. to 8 $\frac{3}{4}$ in. outside diameter.



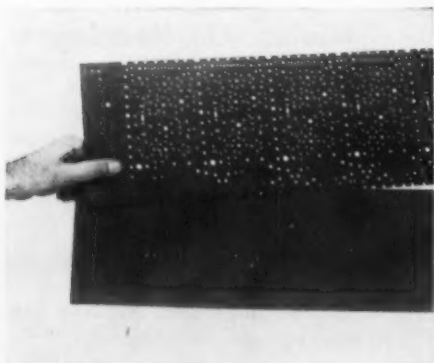
BRITISH TAP: This blast furnace being tapped at the Appleby-Frodingham works of the United Steel Companies, Scunthorpe, Lincolnshire, contributed to England's record 24.3 million-ton steel output in 1957.

How
DENISON
MULTIPRESS
serves the
ELECTRONIC
INDUSTRY



450 HOLES AT A TIME... Multipress punches radio-TV chassis on this 100-ton Denison hydraulic Multipress at Motorola, Inc., Chicago.

Precision-punching TV chassis holes faster—450 at a time—at **MOTOROLA** with **DENISON** hydraulic Multipress



RESULTS... Motorola's plastic chassis bases are punched faster, to precise limits with Denison Multipress.

At a Motorola plant in Chicago, plated-circuit chassis (designed as a base for radio and TV packaged electronic circuits) are precision-punched faster on a 100-ton Denison hydraulic Multipress.

With one quick, controlled ram stroke, Multipress punches up to 450 holes at a time in these plastic chassis boards. And Multipress does the job without shock to exact pre-set pressures...with absolute control after breakthrough.

Precision hydraulic control means Multipress punches holes cleaner, smoother...affording a uniform plating surface inside each hole. No bulging around holes...no cracking between holes...minimum breakout.

Plus benefits: die life is improved...there's almost no punch breakage...far less scrap loss compared to the former mechanical method which also had high shock and slow punching speed. With its fast setup, Multipress handles 15 different dies with quick changeover to other full-production jobs.

Endless jobs throughout the electronic and other industries can be done faster...for less cost with Denison hydraulic Multipress—from 1 to 100 tons. Ask your Denison production specialist to show you how.

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HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

Why Missile Work Is Hard to Get

■ Supplying the missile market—the newest multi-million dollar customer—is boiling down to a problem of getting eager suppliers in touch with willing buyers. It's proving a tough job gearing military procurement to the space age.

Top missile and rocket experts in Washington are convinced present-day capacity, with retooling, can meet the needs of the explosively growing missile age for some time. It can, that is, if the makers of specialized metals, electronics, special parts and tools can get together with the military and the prime contractors.

Unification Needed—In a nutshell, most would-be suppliers to

the missile market have one simple but important complaint—there's no single missile program, and therefore no way to hunt down the contracts and bid specifications they need to get in the business.

While the military merits of a single space missile agency are being debated around the halls of Congress and the Pentagon, the need from an industrial standpoint is crystal clear, businessmen are telling government officials.

Industry itself, through various associations, is trying to bridge the gap between supplier and buyer.

Get Together—The newly formed Association of Missile and Rocket Industries will begin a series of

meetings in key industrial cities late this month. The first such meeting is scheduled for Cleveland (Carter Hotel). Other meetings will follow in rapid order in such cities as Detroit, the New England area, New York and New Jersey.

Purpose of these AMRI meetings is to try to pinpoint in seminar-type sessions how the industries of each state can get in on the missile business. The meetings are aimed primarily at executives and sales representatives—not scientists and engineers. Each meeting will be highlighted by panels of government procurement officers from the local area as well as Washington.

Keep in Touch—Kendall K. Hoyt, executive director of the association, plans to try to set up semi-permanent local chapters in each of the cities to keep the industrialists in touch with government buying agents.

A three-day industrial missile conference scheduled in May in Washington will feature discussions of financing, procurement, production, availability of scientific information, and other subjects of the new missile business. Tentative dates for this conference are May 22, 23, and 24.

From Hottest to Coldest



IT'S COLD INSIDE: Westinghouse test chamber duplicates world's worst temperatures—steaming heat of the jungle or the frigid blasts of the arctic. Purpose: To check ability of combat equipment to operate in temperature extremes. Under test in -65°F temperature is Fiberglas radome that houses automatic armament system for Navy interceptor.

Mining Aid Hearings

Congress next month will begin hammering out a long-range program to aid the metal and mineral mining industries.

Hearings have been scheduled to open March 24 by a Senate Interior Subcommittee. They will consider methods of helping a wide range of minerals and metals, including lead, zinc, iron ore, and tungsten.

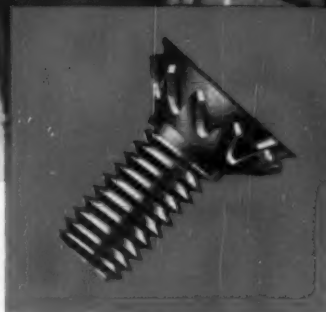
The mineral industries have been pleading for a long-range program to ease depressed conditions, centered around higher tariffs, for several years. The outlook for Congressional approval of a program is improved this year because it will help offset opposition to the Administration's bid for an extension of tariff-cutting powers in the Reciprocal Trade Act.

36 Sources

CONVENIENTLY LOCATED FOR
FAST SERVICE

AMERICAN SCREW COMPANY _____ Willimantic, Connecticut
ANCHOR FASTENERS, INC. _____ Cleveland 5, Ohio
THE BLAKE & JOHNSON CO. _____ Waterville 14, Connecticut
BUTCHER & HART MFG. CO. _____ Altoona, Pennsylvania
CENTRAL SCREW COMPANY _____ Chicago 9, Illinois
 _____ Keene, New Hampshire
 _____ Frankfort, Kentucky
CONNECTICUT SCREW & RIVET CO., INC. _____ Waterbury 20, Connecticut
CONTINENTAL SCREW CO. _____ New Bedford, Massachusetts
ECONOMY SCREW CORP. _____ Chicago 14, Illinois
ELCO TOOL & SCREW CORPORATION _____ Rockford, Illinois
FEDERAL SCREW WORKS _____ Detroit 10, Michigan
GREAT LAKES SCREW CORPORATION _____ Chicago 27, Illinois
H. M. HARPER CO. _____ Marlon Grove, Illinois
HARVEY HUBBELL, INC. _____ Bridgeport 2, Connecticut
**INDIANA METAL PRODUCTS DIVISION,
TEXTRON INC.** _____ Rochester, Indiana
LAKE ERIE SCREW CORP. _____ Cleveland 7, Ohio
THE LAMSON & SESSIONS CO. _____ Cleveland 2, Ohio
MIDLAND SCREW CORP. _____ Chicago 32, Illinois
NATIONAL LOCK COMPANY _____ Rockford, Illinois
THE NATIONAL SCREW & MFG. CO. _____ Cleveland 4, Ohio
 _____ Los Angeles 22, California
**PARKER-KALON DIVISION, GENERAL AMERICAN
TRANSPORTATION CORP.** _____ Clifton, New Jersey
PHEOLL MANUFACTURING CO. _____ Chicago 50, Illinois
PITTSBURGH SCREW & BOLT CORP. _____ Pittsburgh 33, Pennsylvania
**PROGRESSIVE MANUFACTURING CO.,
DIV. OF TORRINGTON CO.** _____ Torrington, Connecticut
**RELIANCE DIVISION, EATON
MANUFACTURING CO.** _____ Massillon, Ohio
REPUBLIC STEEL CORP. _____ Bolt & Nut Division, Cleveland 13, Ohio
RING SCREW WORKS _____ Van Dyke, Michigan
ROCKFORD SCREW PRODUCTS CO. _____ Rockford, Illinois
RUSSELL, BURDSALL & WARD BOLT & NUT CO. _____ Port Chester, New York
 _____ Los Angeles 33, California
 _____ Rock Falls, Illinois
SCOVILL MANUFACTURING CO. _____ Waterville Division, Waterville 48, Connecticut
SEMS DIVISION, TEXTRON INC. _____ Rockford, Illinois
SHAKEPROOF DIVISION, ILLINOIS TOOL WORKS _____ Elgin, Illinois
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For a perfect match, specify
SHAKEPROOF® Lock Washers
when ordering Sems. They're designed to
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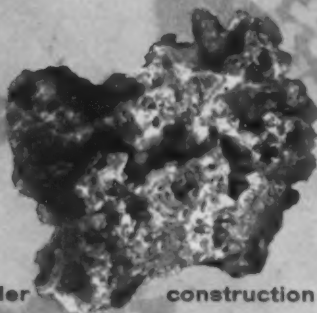
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DRAVO-LURGI sintering plants now under construction total an annual capacity over 11,000,000 tons. The design resources of Lurgi combined with Dravo's extensive engineering and design facilities are available to help you develop equipment or complete plants for sintering, pelletizing and related ore processing for both ferrous and non-ferrous metals. Write to Dravo Corporation, Dravo Building, Pittsburgh 22, Pennsylvania.

DRAVO
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Donn D. Greenshields

An Executive Makes a Big Move

Packing up an entire company and relocating miles away is a gigantic undertaking.

Here is how one company president visualized, sold, and engineered the job.

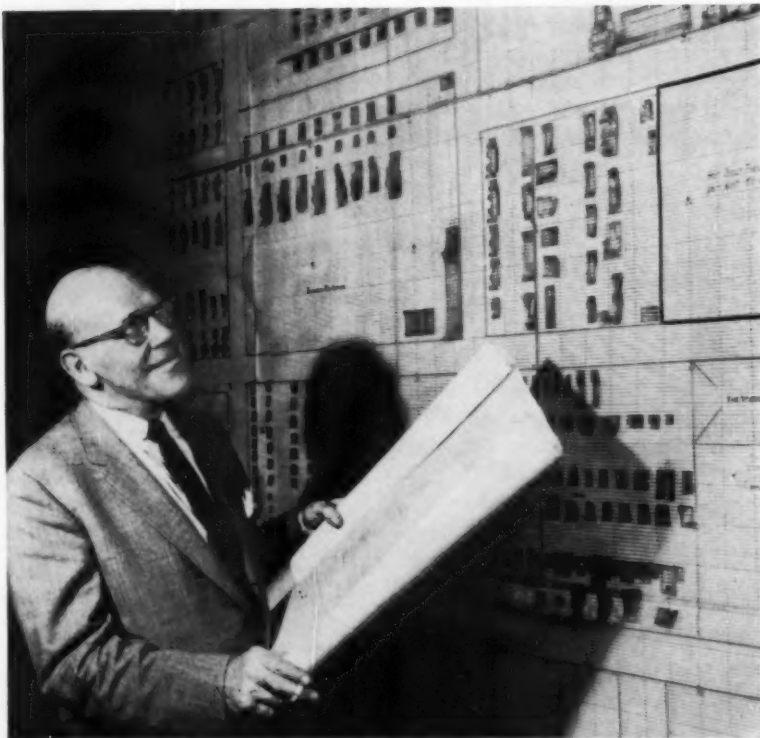
■ Moving 1000 employees and millions of dollars worth of machinery 40 miles from Pittsburgh to Mt. Pleasant, Pa., is no trifling task to Donn D. Greenshields, president of Pittsburgh Screw and Bolt Corp. He regards it as one of the major responsibilities of his life.

The big move is his baby. It was several years in planning and he still spends much of his time ironing out kinks in the schedule. The new plant is expected to start producing in May, but the move probably will not be completed until December, 1958.

The Beginning—It all started in the spring of 1955, when Donn Greenshields was brought into the company as president. For the first few months hardly anybody knew he was around. The new chief listened attentively at meetings and asked an occasional question. Quietly, he inspected the company's plants.

Then one day in the summer of 1955, he called a meeting of the board and announced plans to abandon two old, crowded plants in Pittsburgh and to build a new consolidated plant in the country. This was the first in a series of shockwaves to hit the directors.

Major Changes Follow — Next, he proposed to borrow \$5½ million to finance the project. This was followed by a shakeup in Pittsburgh Screw and Bolt's management. He



DONN GREENSHIELDS: Assign as much responsibility as possible.

brought in two young vice presidents from competing companies. Then he expanded and diversified the company's product lines by acquiring firms in the small bolt and special products fields.


Greenshields' reorganized management and his aggressive expansion plans were in a large sense collateral on which the company was able to borrow the needed \$5½ million. The money-lenders apparently felt the same confidence in the energetic executive as did the board of directors.

His Point of View—The onetime captain (1928) of Penn State University's football squad and


member of the professional Brooklyn Dodgers football team, believes in letting others have a turn at carrying the ball. He operates under the management philosophy of giving "as many people as possible a voice in all policies and assign as much responsibility as possible."

Donn Greenshields is also an optimist. He predicts 1958 will be the opposite of 1957—uphill slowly instead of downhill slowly. And he believes the next 10 years will find our economy in excellent shape.

To prove he has the courage of his convictions, Mr. Greenshields is going full speed ahead on expansion plans in spite of the current recession.



How to squeeze more production from your automatic forging equipment *...at no extra cost*



AUTOMATIC forging machines are no better than the uniformity of the steel you process. When structural or chemical changes occur in the steel you're using you have to interrupt operations to adjust your equipment. And you lose the continuous production you paid for!

You can avoid these interruptions by using uniform steel. Timken® electric furnace fine alloy steel, for instance. It's uniform from bar to bar, heat to heat, order to order.

We take many extra quality-control steps to make sure it's uniform—many of them were American steel industry "firsts". For

example, our magnetic stirrer for molten steel assures equal distribution of alloys, uniform temperature and working of the slag. A direct-reading spectrometer insures exactly correct composition to the very moment a heat is tapped. And individual order-handling assures uniformity that meets your own end-use requirements.

You'll squeeze the most production from your automatic forging equipment, at no extra cost, by specifying Timken fine alloy steel. You'll get uniform steel and faster, continuous production. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

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SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

A Lift from Defense Spending

It was a foregone conclusion that effects on the economy of the missile boom would be indirect, rather than direct.

Some of the effects of the new defense era are starting to filter through.

■ There are indications that some of the vast expenditures for missiles and missile-era defense items are beginning to trickle into the overall economy.

It's nothing startling yet. There's no change from original predictions that missiles themselves won't automatically trigger a new boom. Effects on general business will be indirect, rather than direct.

Modest Effects—But you can notice it here and there with modest announcements of expansion or building plans from companies installing facilities to manufacture missile parts or components.

They could be for heat exchangers, fuel tanks, rocket motor parts, elements for launching sites, or any of the multitude of items going into the missile program.

Adds Up—In addition, there are more dramatic announcements of nuclear-powered, missile-firing submarines. Here again, benefits are local, for the shipyard town, or specialized, for companies involved in nuclear energy work.

They are beginning to add up, however, and before many months a gentle, but tangible, effect of the accelerated missile program is going to be felt on business.

Nothing Dramatic—This very modest indication isn't going to stem the tide of the recession in itself. But business will have to get its

confidence from small indicators. There are no dramatic events in the foreseeable future that will signify the end of the recession and the start of a new period of record-breaking prosperity.

Any uptrend is unlikely while

both business and the consumer are in a retrenching mood. It will take a realization that the economy is not falling apart, that there are a few bullish forces at work, before an uptrend starts. It will be gradual, not sudden.

Needed: More Consumers

Buying Down—More attention will have to be directed at the consumer, to find out what will stimulate consumer buying.

Even at the peak of the recent boom era, from late 1954 through late 1957, many businessmen were seriously concerned over failure of consumer spending for hard goods to parallel other elements of the economy.

As a result, the end of the capital goods spending spree left some industries over-expanded, if only temporarily. It will now take a substantial boost to consumer confidence, and spending, to bring these industries up to anywhere near capacity.

U. S. to the Rescue—The government is now expected to step into the gap left by the capital goods demise and provide the means of bolstering personal income.

It should be emphasized again, that most economists, nearly all important government figures, and more businessmen than care to admit it, believe that strong government action will be necessary to spark an upturn.

Not Too Bad—Things at the consumer level are not as bad as outward business conditions indicate. Personal income is down, and

down significantly, but it is still running at the annual rate of about \$340 billion, well above what it was a year ago. Savings are high. The consumer may be conservative, but he's not demoralized.

Nevertheless, spending for almost any significant type of consumer goods is well down from a year ago. A Dun and Bradstreet review notes "noticeable year-to-year declines" in refrigerators, dishwashers, and TV sets. The auto production rate, over 30 pct behind a year ago, speaks for itself.

Indicators Down

The regular business indicators continue to be discouraging. The Federal Reserve Board's Index of Industrial Production dropped again in January to 133.

This is down three points from December, and the February index will probably show an additional decline. This represents an 8 pct drop from last summer and 9 pct from a year ago, when the index stood at 146 in January of 1957.

Cutbacks in durable goods industries continue to account for most of the decline in industrial output.

One favorable indication: Housing starts in January were at an annual rate of 1,030,000 units, about 8 pct above the rate of a year ago.

Automatic Steering Is Coming

GM Proves Electronically-Guided Car Is Workable

The time may not be far off when cars are steered with computers and servo mechanisms.

Low cost would bring new era of driving ease and highway traffic control.—By H. R. Neal.

■ A one-mile long, two-lane check road at General Motors Technical Center may have obsoleted the nation's 40,000-mile super highway program.

In the first public demonstration of a self-steering car, GM indicated the possibility of a built-in guidance system for "tomorrow's highways." Some GM officials estimated auto-

matic devices to control all phases of driving may be feasible by 1961, particularly on turnpikes and new super highways.

Buried Cable Transmits — The test car, a 1958 Chevrolet, was guided by a combined electronic computer and servo system picking up magnetic signals from a low frequency electrical cable beneath the road's surface.

A GM technician, acting as sometime driver, drove the car over the track and through banked turns at speeds of 20-40 mph. While the technician controlled the speed, the steering wheel moved by itself. A switch let him cut out the auto-

matic guidance and steer the car manually.

Joseph B. Bidwell, head of GM Research Staff's Engineering Mechanics Dept. and director of the guidance system project, explained the workings of the system.

Dashboard Computer — Low frequency alternating current in the highway cable creates a circular magnetic field that extends the length of the cable. He likened it to "a very short range radar beam." The system uses 40 watts and operates on 2000 cycles. This eliminates the possibility of interference from standard power lines.

On the front bumper of the test vehicle is a pair of tuned pickup coils which straddle the cable's magnetic field. Any deviation or lateral movement of the car causes a difference in voltage from one coil to the other. These variations feed into a small electronic analogue computer on the instrument panel. The computer is linked with a servo system that controls a modified power steering unit.

More to be Done—Dr. Lawrence R. Hafstad, vice president in charge of GM Research Staff, cautioned against expecting the system to be available in the very near future. He pointed out it is still in the research stage and as yet is limited to steering control.

At the same time, Dr. Hafstad hinted it "may become a more sophisticated system for controlling vehicle spacing, detecting location of cars or giving the driver signals for throttle and brake control."

Dr. Hafstad and Mr. Bidwell said they chose their system for its ultimate simplicity. It requires only low frequency power. Its sensitivity



KEY PARTS: Dr. L. R. Hafstad, GM vice president, is shown with main components of an electro-magnetic steering system. They include tuned pickup coils, a wire which produces magnetic path, and a small computer.



COMMON SENSE SIMPLIFICATION CUTS INVENTORY

● Reduce fastener inventory by simplifying usage requirements

● Lower your stock handling and purchasing costs, too

To take full economic advantage of "standard" fasteners, standardize their *usage*, too. The fewer types and sizes you can get along with, the lower your buying, stock handling and even assembly costs will be.

Case history: At one plant, the man tackling the job found more than 23,000 fastener items in inventory. Without need to consult anyone, he eliminated 1700 items immediately. With study, he figures to cut the rest in half.

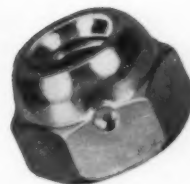
Some suggestions: (1) Stock *only* one pattern of nut, not two or more, for each size bolt. (2) Use coarse threads almost exclusively; fine threads are seldom necessary. (3) Eliminate as many bolt lengths and diameters as feasible. Change a minor specification rather than add an in-between size. (4) Settle on

fewer materials. Two grades of steel satisfy most strength needs. (5) Specify fewer head styles for bolts and screws.

Much simplification can be done by common sense alone; much *more* with the help of a fastener engineer. Ask the RB&W Fastener Man to show you. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.



Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**



Staked acorn nuts lock securely

Staking opposite sides of these RB&W acorn nuts deforms threads for a positive grip. It also puts middle of nut slightly out-of-round, for a spring tension locking effect. They're designed for applications such as outdoor furniture, where anchoring fasteners is more important than solid seating. Available in aluminum, steel, silicon bronze.

These all-metal nuts can also be furnished in double chamfered style. Since they lock with their middle threads, they can be turned onto screw from *either* side.



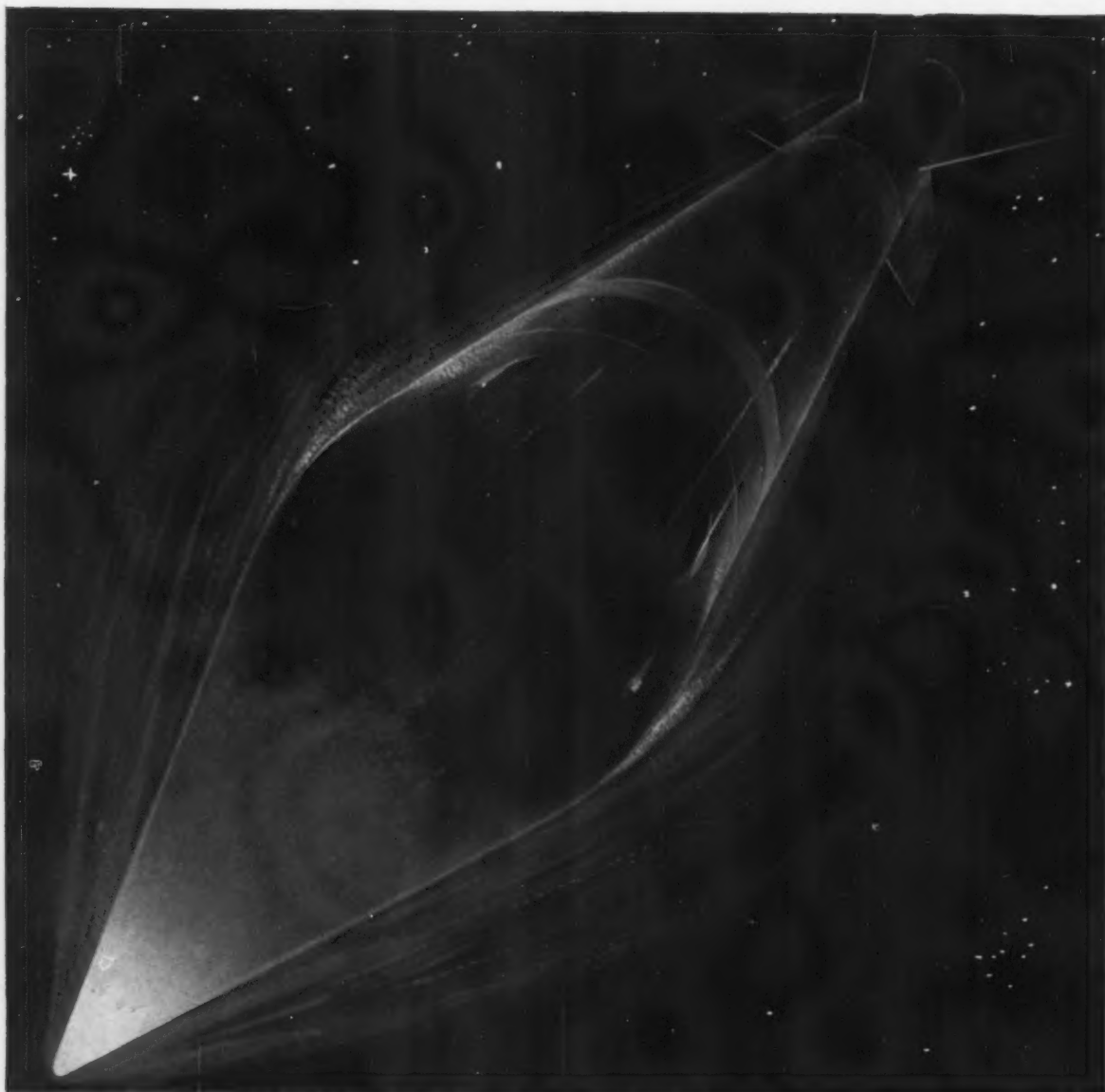
Tapping screws that lock into place

RB&W offers tapping screws with Spin-Lock® design. Hardened teeth on periphery of head lock into seat when screw is tightened. They resist backing off from vibration or thermal expansion and contraction.

In one case, continual heating and cooling had caused handle screws on certain flatirons to loosen. Every type tried failed to stay tight under these conditions, until RB&W's unique Spin-Lock tapping screws were installed. That did it.

Spin-Lock screws are available with flat heads or hex heads, and are reusable. Send for bulletin.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY



Why it gets hot in there

Closely packed within the thin shell of a guided missile is a mass of electronic equipment. Crowded in so tightly, the tubes and other components scarcely have a chance to dissipate their own intense heat.

In addition, when the missile cuts the air at supersonic speeds, that thin shell builds up screaming heat—enough to wilt metal, to say nothing of the insulations that keep the electronic systems working.

Making electronic insulations that resist this murderous heat is one of the big projects going on today at CDF. A sixty-year reputation for highest-quality insulations makes CDF a major supplier

to the guided-missile field—where half of a multi-billion-dollar budget goes into electronic equipment.

CDF products serve not only the electronic industry but also the aircraft, automotive, communications, and railway fields—in fact, wherever quality mechanical and electrical parts are needed.

Your product may well be improved through the engineering co-operation of CDF experts. CDF sales engineers are always ready to help you make good equipment even better.



CONTINENTAL-DIAMOND FIBRE

A SUBSIDIARY OF THE *Bush* COMPANY • NEWARK 22, DEL.

Automotive Production

WEEK ENDING	CARS	TRUCKS
Feb. 22, 1958	94,573	17,476
Feb. 23, 1957	138,938	23,342
Feb. 15, 1958	101,656	18,709
Feb. 16, 1957	145,846	24,113
TO DATE 1958	794,573	138,376
TO DATE 1957	1,100,838	168,742

*Preliminary

Source: Ward's Reports

is good. And with the cable planted in the highway concrete it wouldn't suffer from weather or radiation interference.

Cost Is Reasonable — They also said the system could probably be easily integrated into a highway network. One possibility is in the form of a separate "automatic lane" for cars equipped with the device. In this way, they explained, the system would be feasible in a transition period during which automatically guided and non-automatically guided vehicles were using the highways.

While it is difficult to set a probable cost figure on mass produced units, it isn't expected to be too high. Mr. Bidwell estimated it might not cost any more than a car radio and power steering.

1957 Not So Bad, After All

In making public the results of their year-end accounting, the Big Three gave evidence 1957 was a profitable year. Combined sales totaled \$20.3 billion with profits exceeding \$1.2 billion.

General Motors reported its second best dollar sales volume in 1957 of \$10,990,000,000, compared with \$10,796,000,000 in 1956 and \$12,443,000,000 in record 1955. However, 1957's profits dipped to \$843,500,000, slightly behind the \$847,400,000 net earnings for 1956, and well behind the \$1,189,500,000 of 1955. Factory sales of cars and trucks from all GM manufacturing sources were 3,855,000 in 1957, or 95 pct of the 1956 total.



LOOK, NO HANDS! A GM Research Staff employee confidently takes her hands off wheel while automatic steering device takes over for test run.

Ford Reports—Ford Motor Co.'s sales of \$5,771,000,000 were 24.2 pct greater than 1956 and highest in the firm's history. In 1956, dollar sales reached \$4,647,000,000 and in 1955 were \$5,594,000,000, the previous high. Net earnings for the year were up to \$282,800,000, greater than 1956 earnings of \$236,600,000, but considerably under 1955 profits of \$437,000,000.

Factory sales of Ford-built cars and trucks in 1957 totaled 2,224,205 units, second only to 1955. After years of chasing its industry sales leader, Ford Division outsold

Chevrolet at the retail level by 37,329 cars—1,493,617 to 1,456,288.

Chrysler Tops Record—Chrysler Corp., like Ford, reached a new dollar sales high. The new mark of \$3,565,000,000 eclipses the 1956 volume of \$2,676,000,000 and the 1955 total of \$3,466,000,000. Net earnings for the year shot up to \$119,952,000. In dismal 1956, the figure was only \$19,952,000, down sharply from \$100,063,000 in 1955. Unit sales for the year amounted to 1,381,951 cars and trucks.

THE BULL OF THE WOODS





Soft spot
for old
machines
?

*Soft spot
in profits too?*

Talk to

Snyder

TOOL AND ENGINEERING COMPANY

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Special Machine Tools with Automation for More Than 30 Years

Congress Is Cool to Tariff Law

Sentiment Grows for More Protection

Mounting imports result in heavy congressional mail favoring more protection.

Congress is unlikely to grant 5-year extension of present law.
—By G. H. Baker.

■ Rising imports and unemployment are causing grave damage to the prestige of the reciprocal trade program. The 24-year-old tariff law comes up before Congress this year for renewal.

The Eisenhower Administration wants the Congress to extend the law for another five years, and to grant authority to cut tariffs further by an average 5 pct a year up to a maximum 25 pct. It is extremely unlikely that the Congress will approve anything like this.

Sentiment Against—Congress reports its mail from manufacturing areas is running heavily in favor of higher—not lower—tariffs. Imports of steel products, automobiles, and many small manufactured metal goods were at record totals last year.

And preliminary 1958 figures show that imports are again arriving in record volume. The current clamor is for some kind of action to slow up these imports.

Would Limit President—Under the present reciprocal trade law, the U. S. Tariff Commission can only recommend higher tariffs to the White House. The President is under no obligation to accept these recommendations. There's increasing talk now of changing this part of the law so as to force the President to accept and put into effect the recommendations of the Tariff Commission.

One thing is certain: Congress is in no mood to approve a five-year extension of the present law. A one or two-year extension is all that can reasonably be expected this year. And the requested authority for additional 25 pct reductions likewise is falling on unsympathetic ears. The most that can be hoped for is an extension of the status quo, as far as the Administration is concerned.

Tax Cut Likely

Chances for tax cuts have improved greatly in recent weeks. If the expected upturn in business doesn't materialize by April 1, some rate reductions this year can definitely be expected.

The Eisenhower Administration

refuses to admit any alarm over the current recession. But it's an open secret in Washington that the White House economic advisers are readying a tax-cut plan to submit to Congress if business activity doesn't pick up soon. The advisers hope, of course, that the long-awaited upturn will come soon, thereby removing the need for tax cuts.

Congressional leaders, too, are drawing up tax-cut plans on the same basis. Democrats favor reductions for individuals only. They're talking of increasing the existing \$600 exemption to \$700 or \$800. Republicans are thinking more in terms of across-the-board reductions for individuals, plus lowering the rate on corporation income from 52 pct to perhaps 47 pct.

Space Flight Scheduled Next Year

A Forerunner—Springboard into manned space flight is to be the takeoff of the Air Force X-15 rocket plane next year.

The X-15 itself isn't bound on any interstellar flight. It's supposed climb above 100 miles and travel at between 3500 and 4000 mph. But the Air Force is highly optimistic about the value of the plane as the forerunner to well-advanced projects.

Manned Satellite—Flying generals hold that much more ambitious actions than the launching of the X-15 are contemplated. They are weighing proposals for a variety of follow-on programs. Topping the list is the suggested creation of a manned satellite, developed from the rocket "bird."

Contracts with North American

Aviation, Inc., call for production of the X-15 aircraft. Conceivably, improved design of such a specialized research plane could yield a satellite vehicle.

Not Official—Prodding the Air Force to go on and explore this project, Sen. Chavez, D., N. M., complains of a lack of decision among top officials. Last fall, he says, he was briefed on what he calls an "X-15B"—a true manned rocket ship. But he insists there has been no decision to move forward with it.

Officially, the Air Force doesn't admit there is an X-15B project. A satellite as the successor to the X-15, with the project designated as the X-15B, is a logical product, however.



AMERICAN ORIGINALS IN IRON AND STEEL



The forge in the chimney corner

As our nation continued to expand after the Revolutionary War, one of its most pressing needs was for greater production of simple, flat, iron nails. The nails of that time generally were crude fastenings, hammered by hand from strips of metal. The process was inefficient and time consuming. But, the need was so great that even children in the home were pressed into service as nail makers.

In 1789, a Member of Congress stated: "It has become common for our country people to erect small forges in chimney corners. Great quantities of nails are made . . . even by children." But a year later, in 1790, the situation was suddenly changed by a Jacob Perkins of Newburyport, Massachusetts. Perkins, a

mechanical genius of his time, invented a nail-making machine capable of producing 200,000 nails per day, and thus brought an end to the task of household nail making.

* * * *

Many men, machines, methods and materials have contributed to the development of our iron and steel industry. We at The J. E. Baker Company are proud of the fact that, since 1889, steel makers have relied on Baker's Magdolite and Jebcolite, the original dead-burned dolomites for more uniform ingots, greater furnace efficiency, and lower refractory costs. Magdolite and Jebcolite offer many advantages . . . in superior composition, preparation, strength, economy and quality.

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Aircraft Remains Market Bulwark

Planemakers Still Setting Pace in West

Missiles may account for one-third of Farwest aircraft activity by 1959.

But meanwhile subcontractors and suppliers continue sharing in contracts for manned aircraft.
—By R. R. Kay.

■ Don't be misled by all the missile talk.

Planemaking will remain the backbone of the Coast's aircraft industry for many years.

If you're a subcontractor or supplier, the bulk of your 1958 business will be for manned aircraft. The aircraft plants still have a \$7 million backlog. And they'll be getting more large orders. Some of this work is sure to be shared with subcontractors.

Missiles Sweeten Market—Naturally, the big talk and push will be on missiles. Stepped-up missile spending will help cushion the blow the aircraft industry received from last summer's pre-Sputnik defense cuts.

Every major planemaker is deep in missile work. And the new missile orders will help sweeten things up. They'll have an impact on Los Angeles, San Diego, San Francisco Bay Area, Seattle, Phoenix, and Tucson. Before 1959 rolls around, about one-third of the Coast's aircraft industry work will be in missile systems.

Less Labor on Missiles—However, don't overlook this fact: Missile making takes fewer workers than planemaking. One engineer, for example, kept 10 production workers going on Convair's F-102 all-weather interceptor. But the com-

pany is figuring on only one production worker per engineer for its Atlas Intercontinental Ballistic Missile (ICBM).

The Navy's Polaris surface-to-surface missile program is due for a hypo. The word has gone out: Full zoom ahead on this project.

Lockheed Aircraft, the missile system's manager, will get another contract, this one for \$46 million.

Shipyards Busier

West Coast shipbuilding orders are now steaming in at a good pace.

Todd Shipyards, Seattle, just got an \$18 million contract to build an-

other guided missile destroyer. The vessel will carry the Tartar surface-to-air missile. A company spokesman says business now on the books will keep the yard humming through 1961.

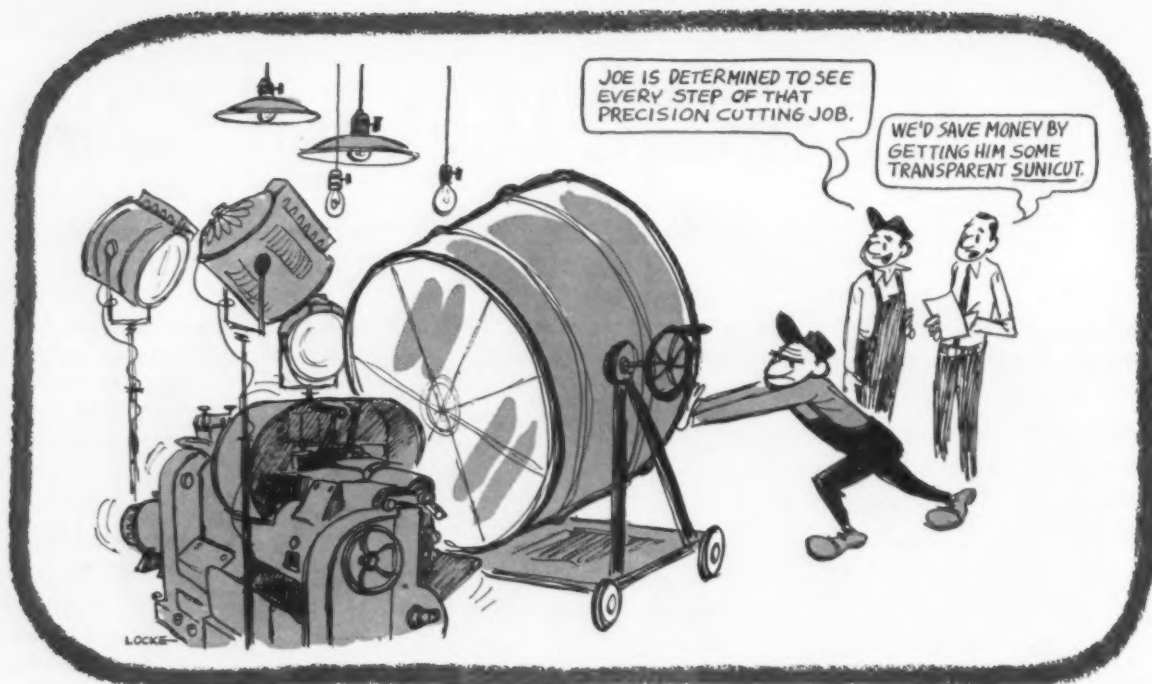
Fewer Seattle Jobless

Unemployment insurance claims in the Seattle area are dropping. Commenting on the trend, the State Employment Security Dept. says the state's employment market has apparently reached the turning point. The important industrial Seattle-King county area has the state's lowest percentage of joblessness.

Early-Day Gatling Gun Stages a Comeback



SUPERSONIC STINGER: Automatic weapon patterned after the Gatling machine gun can fire 7000 rounds per minute from its six rotating barrels. It will be used on the Air Force B-58 now in production at Convair.



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For full information about Sunicut cutting oils, call your Sun representative, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-2.

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Numerical Miller Pays Dividends

Mogul Unit Permits Production Savings

Metalworkers may find king-size, controlled units are best bet for carving intricate parts from large blocks.

Lockheed reports tape-run miller does better job at less cost in aircraft part machining.
—By E. J. Egan, Jr.

■ So far aircraft firms are the only ones to use king-size, numerically controlled milling machines—the kind that will automatically carve intricate parts out of metal blocks 14 ft long and 4 ft wide. But other metalworking companies may find it worthwhile to follow suit. These mogul millers appear to pay handsome dividends on the initial investment.

Take the case of Lockheed Aircraft Co. at its Burbank, Calif., plant. To produce major parts for its F-104 Starfighter jet, the firm recently installed a multiple-axis profile milling machine built by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

Machine-motion instructions are recorded on 14-channel magnetic tape and translated into cutting-tool movements through a General Electric electronic control system.

Worthwhile Savings—Here's the type of savings that Lockheed is getting out of the new machine, and in less than six months after it was first installed:

One F-104 part, which originally cost \$69.50 to machine by pre-tape control methods, is now turned out for \$15.70.

Another component, which formerly cost \$40.35 to make, is now turned out for about \$14.30.

Production Advantages—Several

factors contribute to these big savings. Trouble free operation of the machine is certainly one of the most important. According to Dr. L. H. Ferrish, Lockheed's numerical control coordinator, "Only a vacuum tube voltmeter is needed to service the system." He reports that the machine has been shut down just twice in four months of continuous operation, and then only for the length of time it took to replace a vacuum tube.

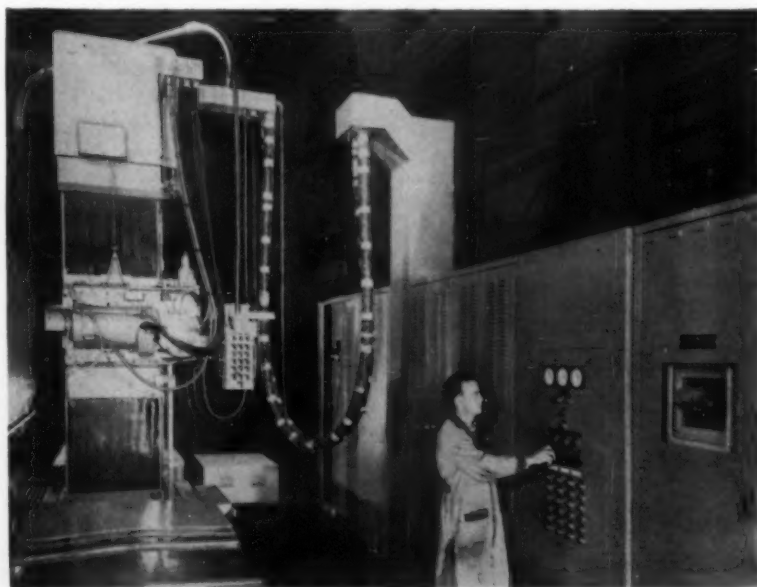
The new miller gains production time in other ways, too. By its very nature it reduces the hours and days formerly required to change special cutting tools, make new fixture setups, and align templates for each new job.

Gets Closer Tolerances—Fewer rejects on critical parts also save

time and money in tape controlled machining. Lockheed's new unit has milled 12-ft long spar and skin mill cams to accuracies ranging from ± 0.0005 in. to ± 0.001 in. Similar tools, machined in more conventional ways, show an average accuracy within ± 0.005 in.

Closer tolerances produced on the new machine will, Dr. Ferrish expects, "result in a considerable weight saving on large aircraft."

Operating the unit is simplicity itself. Tape signals are relayed automatically at the rate of 200 per second to control each machine feed motion and a variety of auxiliary functions. All the operator does is set the machine, push a start button and then watch the operation until it is complete. He stops the machine cycle only if it's necessary to replace dull cutting tools.



WORLD'S FIRST: Builder Giddings & Lewis says this is world's first numerically controlled, variable axis airframe profile milling machine. It will be used in production of airframe components for F-104 interceptor.

INDUSTRIAL BRIEFS

Strategic Move—The North American Coal Corp., Cleveland, and Strategic Materials Corp., Buffalo, have organized a joint venture corporation. It will be known as Strategic North American Corp. Purpose is for the developing and exploiting a new process for the recovery of high grade alumina from low grade ores and coal mine wastes. The corporation is empowered to build and operate plants for the production of alumina and aluminum sulfate and to license the process.

Dow Calling Europe—A communication channel has been opened by Dow Chemical Co. linking overseas sales offices and subsidiaries in Europe with headquarters and plant locations in the U. S. The radio circuit between New York and Zurich has been leased by the company from RCA Communications, Inc., and Radio-Suisse. The radio channel is a Dow private line that operates 24 hours a day, seven days a week.

Ready for Missiles—Trane Co.'s \$1.2 million plant for the production of special heat exchangers has been opened at La Crosse, Wis. The modern 76,800 sq ft center will manufacture heat exchangers for heat dissipation in guided missiles and jet aircraft, among other multiple purposes.



"We soon have America back."

Show on the Road—The '58 "Power-Up" road show by Westinghouse Electric Corp. will be shown in more than 125 cities throughout the U. S. between now and mid-summer. It is estimated that 20,000 representatives of local industrial companies, electrical contractors, consulting engineers and architects will see the 90-minute production. About 175 electric utilities will help to carry out the program with Westinghouse.

Swing to Sintered Ore—Republic Steel Corp. has begun work on a \$900,000 expansion of sintering facilities at its Youngstown plant. The expansion will increase the monthly capacity of the sinter plant, located at the No. 1 blast furnace, from about 22,000 tons to 40,000 tons. Function of the plant is to process flue dust and fine ores for recharging in furnaces. Project is expected to be completed by early summer.

On the Way—The American Export Lines, Inc., and the Federal Maritime Board have awarded contracts for the construction of four new merchant ships. Two ships were awarded to National Steel & Shipbuilding Corp., San Diego, Calif. This contract was for \$11,754,501 for each of two ships on a fixed price basis. Another went to the New York Shipbuilding Corp., the low bidder, at \$11,420,983 each on an adjusted price basis.

Power Plus—Westinghouse Electric Corp. is building one of the West's most powerful turbine generators for the Pacific Gas & Electric Co. The multimillion dollar machine, with a guaranteed capacity of 300,000 kw, is expected to generate up to 325,000 kw. That output would boost by almost 50 pct the capacity of PG&E's Pittsburgh, Calif., power plant. It will go into service in 1960.

License Approved—Heppenstall Co. has a licensing agreement with Wilhelm Scheidt, of Kettwig (Ruhr), in West Germany. Scheidt will manufacture and distribute Heppenstall materials handling equipment in

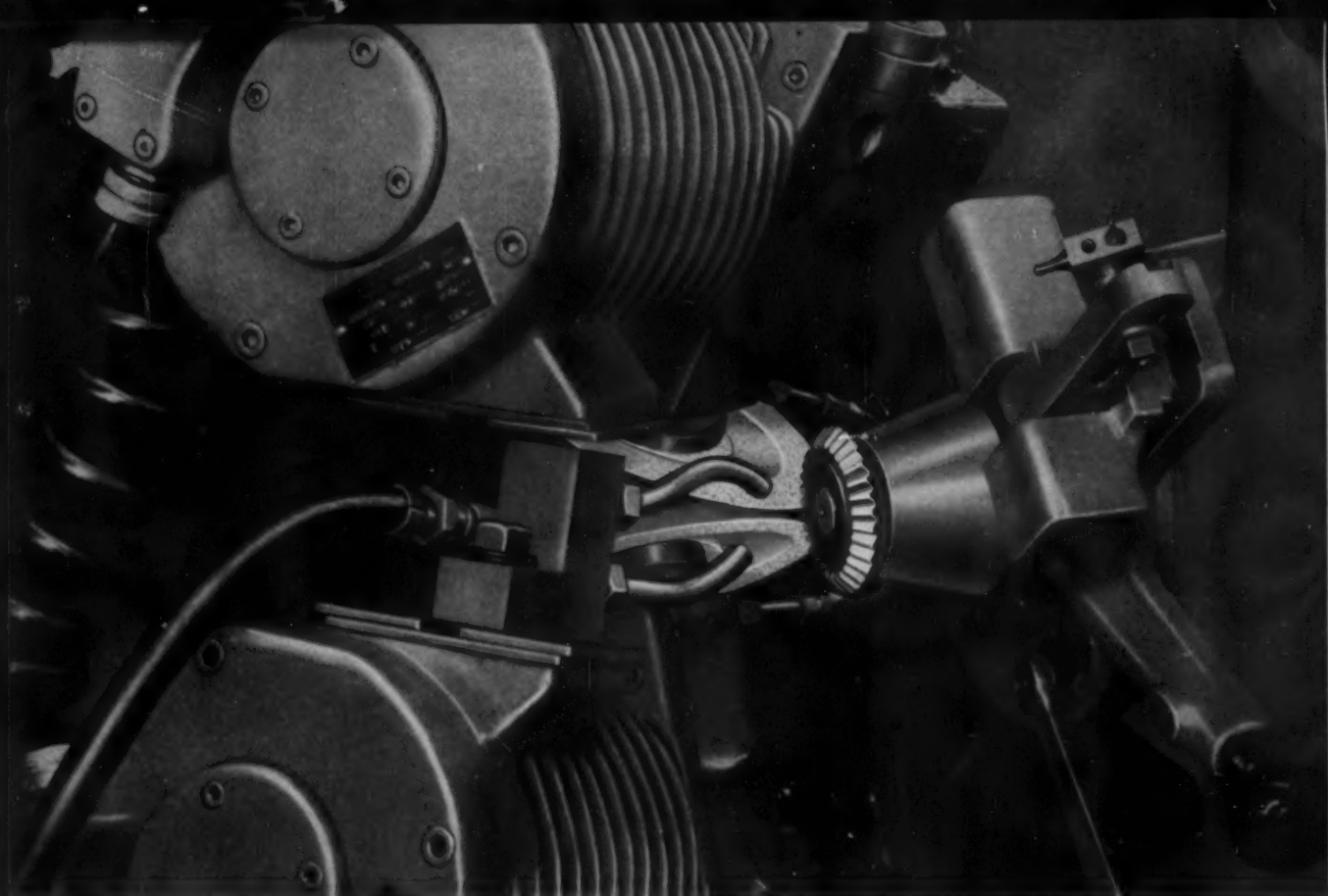
West Germany. In turn, Heppenstall Co. will be the exclusive distributor of Scheidt products in the U. S. and Canada. The German firm is noted for its bucket-type digging devices used in construction and in mining and for its scrap buckets.

German Mill Distributor—Kurt Orban Co., Jersey City, N. J., has been appointed exclusive distributor in the U. S. and Canada for rolling mills manufactured by J. Banning, AG, of Hamm, W. Germany. Although mills made by this 100-year-old company are in operation throughout the world, this marks the first time they will be available in North America. Installation and servicing of Banning rolling mills will be handled by Kurt Orban Co., Inc.

Southern Technicians—The Mid-South Technical Institute, a non-profit organization, has been formed in Birmingham, Ala. It will offer basic and advanced training in the electronics, electricity, air conditioning and refrigeration fields. It will be operated by a board of trustees composed of 25 Alabama business men. The institute has taken over facilities and staff of the Commercial Trades Institute, a private organization.

Hot Enough—Four gas-fired heating furnaces for heating nickel and cobalt base alloys have been purchased by Haynes Stellite Co. from Salem-Brosius, Inc., Pittsburgh. The furnaces will handle hearth loads up to 20,000 lb, heating the charge material to temperatures up to 2285°F. Temperature and furnace pressure control will be provided.

Company in Motion—Maxwell Industries, Inc., formerly located at Macedonia, O., has moved into larger plant facilities at Ashtabula. The firm has also acquired Kiener Cutting Co., Inc., Cleveland. Maxwell Industries, accordingly, enters the field of form tools, carbide and high speed, and will be represented nationally on all tools in their product line.



Now you can grind straight bevel Coniflex® gears

You can *now* use hardened and ground straight bevel gears for many angular drives requiring extreme precision and load carrying capacity.

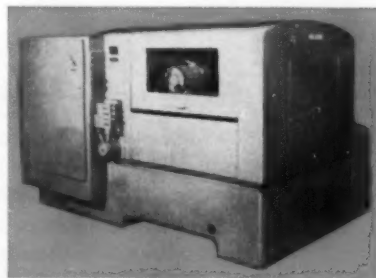
The new Gleason No. 105 Straight Bevel Coniflex* Grinder generates gears with the highest accuracy of spacing and profile, with the tooth profile, fillet radius, and tooth bottom formed into one smooth blended shape by two grinding wheels.

And gears ground on the No. 105 Grinder after hardening *maintain*

their extreme precision even under continuous load operation.

Wet-type grinding on this machine provides fast cycles and excellent finish. Set-up calculations are simple. The completely automatic cycle of the No. 105 Grinder not only assures uniformity of production but also provides great savings in time and production costs.

We will gladly send you more information about the No. 105 Straight Bevel Coniflex Grinder upon request.



The No. 105 Grinder accommodates straight bevel Coniflex gears up to 8½" pitch diameter, 3DP with ratios up to 6:1, cone distances up to 4¼". Gears 20DP and finer may be ground directly from the solid; coarser pitches are ground after semi-finish cutting and hardening.

* Straight bevel gears with localized tooth bearing.



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Pushbutton Line

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"feel" in test
position

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panel space
required

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voltage ratings

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interchangeably
with oil-tight
pushbuttons and
selector switches

OIL-TIGHT OPERATORS



Standard Button



Mushroom Button



Selector Switch



Coin-Operated
Selector Switch



Key-Operated
Selector
Switch



Selector
Pushbutton



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Lockout



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Lockout



Maintained
Contact
Attachment



Selector
Switch and
Pushbutton
Lockout

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4-Position
Joystick
Operator



Wobble Stick Operator



Neoprene Cap

**Here's why Square D Pushbuttons are preferred
—by those who build machines—and by those who buy them!**

Easy to use • Operators require only a single mounting hole for quicker installation. Pressure wire connectors mean simplified wiring.

Longer lasting • All-metal operator construction, anodized aluminum buttons, mean greater mechanical life. Melamine contact blocks with double-break silver contacts assure longer electrical life.

Wide flexibility • Any operator can be used with any contact block to meet all your requirements.

Small size • Only a minimum of panel and back-of-panel space is required.

Variety of contacts • Contact block arrangements include single-pole double-circuit, duplex double-circuit, tandem duplex, three-position duplex, and overlapping contacts.

• • •

FOR COMPLETE INFORMATION on oil-tight pushbuttons, send for Bulletin 9001-T to Square D Company, 4041 North Richards Street, Milwaukee 12, Wisconsin.



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SQUARE D COMPANY

William Sheffield, appointed treasurer, The Garlock Packing Co., Palmyra, N. Y.

W. A. Morton, named president, Loftus Engineering Corp.

Burton Schellenbach, named vice president, sales, H. K. Porter Co., Inc., Pittsburgh headquarters.



A. W. Cain, promoted to president, Volco Brass & Copper Co., Kenilworth, N. J.

I. B. Taylor, Jr., named corporate controller, American Welding & Mfg. Co., Warren and Niles, O.

D. F. Stockburger, appointed controller, The Vaughn Machinery Co., Cuyahoga Falls, O.

L. J. Gorin, Jr., elected secretary, Reynolds International, Inc.



W. D. Kohlins, appointed general manager, Bufllovak Equipment Div., Buffalo, N. Y., Blaw-Knox Co.



Dr. Curt Rolland, promoted to president, New Jersey Rolling Mills, subsidiary of Volco Brass & Copper Co.

W. H. Manning, elected executive vice president, Judson Steel Corp., Emeryville, Calif.; **T. A. Maas, Jr.**, elected secretary.

R. M. Lloyd, named administrative vice president, international and raw materials—staff, U. S. Steel Corp.; **M. D. Millard**, appointed administrative vice president—international.

Richard Lewis, appointed manager, finance, Foundry Dept., General Electric Co., Schenectady.



C. H. Williams, appointed administrative vice president, engineering, U. S. Steel Corp.

MEN IN METALWORKING

A. A. Steele, appointed district sales manager, Denver district sales office, Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Muskegon, Mich.

James Jarvie, named general sales manager, Canadian industrial sales, Ex-Cell-O Corp., Detroit.

A. J. Williamson, appointed general manager, The Universal Steel Co., Cleveland.

P. J. Foley, appointed general manager resale, Marketing Div., Worthington Corp., Harrison, N. J.

A. W. Bentley, appointed plant superintendent, Montreal branch plant, Wallace Barnes Co., Ltd.



D. P. Reynolds, elected executive vice president, Reynolds Metals Co.

J. C. Dilling, named manager, shelving product sales, Berger Div., Republic Steel Corp.

H. H. Upton, named general manager, Hydraulics Div., Brown & Sharpe Mfg. Co. and president, Double A Products Co., a subsidiary.

W. J. Klein, named director, sales promotion, Tractor Group, Allis-Chalmers Mfg. Co.

T. E. Tuech, appointed works auditor, Central Operations, Fairless Works, U. S. Steel Corp., Mor-

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risville, Pa.; **J. R. Dembeck**, named asst. director, cost and statistics, Accounting Dept., Pittsburgh.

K. J. Butler, appointed asst. sales manager, Springs and Formed Wire Dept., Wickwire Spencer Steel Div., The Colorado Fuel and Iron Corp.



J. B. Austin, appointed administrative vice president, research and technology, U. S. Steel Corp.

W. A. Kuhns, named sales representative, Northern California, C. Hager & Sons Hinge Mfg. Co.



C. D. McGuinn, appointed vice president, field operations, NCG Div., National Cylinder Gas Co., Chicago.

L. D. Linta, appointed manager, quality control, Forging Div., Transue & Williams Steel Forging Corp., Alliance, O.

E. L. Nethersole, Jr., named sales representative, Baltimore district office, Allis-Chalmers Industries Group.

J. C. Ralston, named sales engineer, Baldwin-Lima-Hamilton's Standard Steel Works Div., Burnham, Pa.

P. L. Richardson, appointed mill representative, Eastern Stainless Steel Corp., Baltimore, Md.

W. L. Manly, appointed director, sales training, Industries Group, Allis-Chalmers.



J. C. Gray, appointed administrative vice president, raw materials, U. S. Steel Corp.

M. K. Schnurr, Jr., appointed asst. to the general manager, sales, Stainless Steel Div., Jones & Laughlin Steel Corp., Detroit.



T. H. Pike, Jr., appointed vice president, Tube Turns, a division of National Cylinder Gas Co.

S. C. Surratt, promoted product engineer, Standard Equipment Div., Surface Combustion Corp., Toledo, O.; **R. F. Pomeroy**, as product en-

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REDUCES FIXED OPERATING COSTS



BEFORE SERSEAL, steam, vapors and fumes escape from the bath, make working conditions unpleasant, lowering morale.



SERSEAL HAS BLANKETED THE BATH in just 10 seconds. All steam, corrosive fumes and vapors are contained within bath.

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1. Reduces the cost and time required for maintenance of heating elements.
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How the CLAW-TOOTH blade
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CUTS ALL MATERIALS—Steel, titanium, brass, iron, asbestos, plastics, wood, rubber and many other metals and non-metals.

EXTRA FAST CUTTING—The claw-like, positive rake angle teeth literally "pull themselves" into the work—providing more penetrating power and smoother chip flow.

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Convenient "strip-out" Containers —

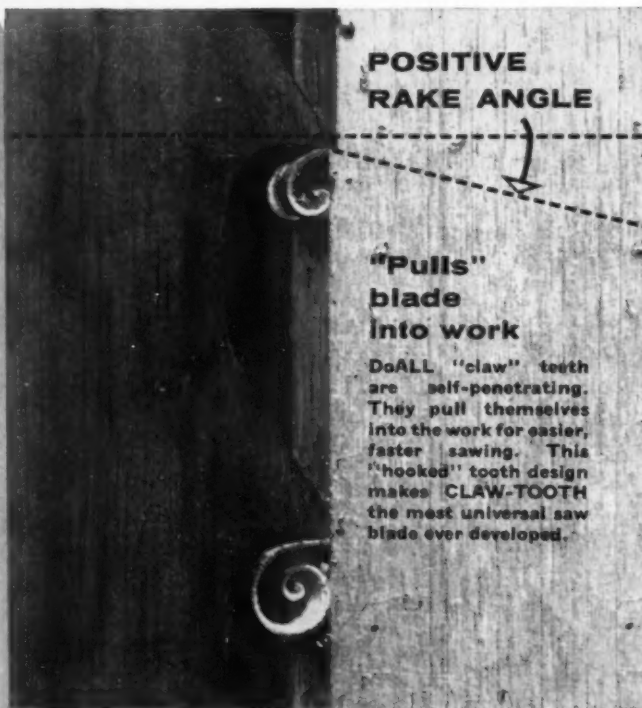


100' or 500' coils in exclusive DoALL "strip-out" boxes for convenience, safety and blade protection.

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RAKE ANGLE**

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blade
into work**

DoALL "claw" teeth are self-penetrating. They pull themselves into the work for easier, faster sawing. This "hooked" tooth design makes CLAW-TOOTH the most universal saw blade ever developed.

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They'll saw faster on any machine!

There's a DoALL saw band for every machine and job . . . but the blade that handles *more jobs better* is the CLAW-TOOTH! For cut-off jobs or contour sawing, the versatile CLAW-TOOTH blade can reduce both your sawing costs and blade inventory.

Available in $\frac{1}{4}$ " to 1" blade width—2, 3, 4, and 6-pitch. For lowest cost per square inch of cutting, specify DoALL CLAW-TOOTH. Or, if you have a special sawing problem, ask about DoALL's free blade selection service—complete recommendations will be furnished for your job.

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gineer, ferrous heat treat equipment; **W. A. Phillips**, as product engineer, nonferrous equipment and **W. F. Parker**, as asst. product engineer, nonferrous equipment.



J. E. Chumbley, appointed vice president, Tube Turns, a division of National Cylinder Gas Co.

J. E. Spearman, appointed manager and **P. J. Kunkler**, named asst. sales manager, The Vaughn Machinery Co., Cuyahoga Falls, O.

R. B. Kurtz, appointed manager, manufacturing, General Purpose Control Dept., Bloomington, Ill., General Electric Co.

OBITUARIES

C. R. Crawford, 68, vice chairman of the board, The Black-Clawson Co.

D. A. Bailey, executive vice president, Judson Steel Corp., Emeryville, Calif.

L. W. Moseley, retired former personnel manager, The Electric Storage Battery Co., Philadelphia.

E. F. Ericson, former president, The Barden Corp., Danbury, Conn.

E. F. Maneely, 79, president, John Maneely Co., Wheatland Tube Co., and Wheatland Steel Products Co.

W. G. Somes, 63, district manager, sales, St. Paul, U. S. Steel Corp.



Low Headroom with this **MANSAVER** Style 1145 **COIL GRAB**

Under the jib crane shown in a low storage bay, this

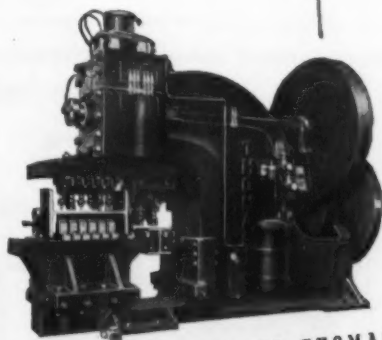
Mansaver style 1145 permits highest possible storage. The low headroom feature is obtained by resetting the grab for a limited portion of a complete range. The range of rim thicknesses it can handle is equal to that of other designs. This style grab is available in several different models, all fully automatic. Write for names and addresses of neighboring plants where you can see Mansaver Grabs in operation.

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THE newly designed Thomas Beam Punches are built in sizes to handle beams up to 12"-18"-24"-30" and 36", web and flange punching, with a single tool set-up. Any of the five sizes may be used with or without a Thomas spacing Table, depending on production needs.

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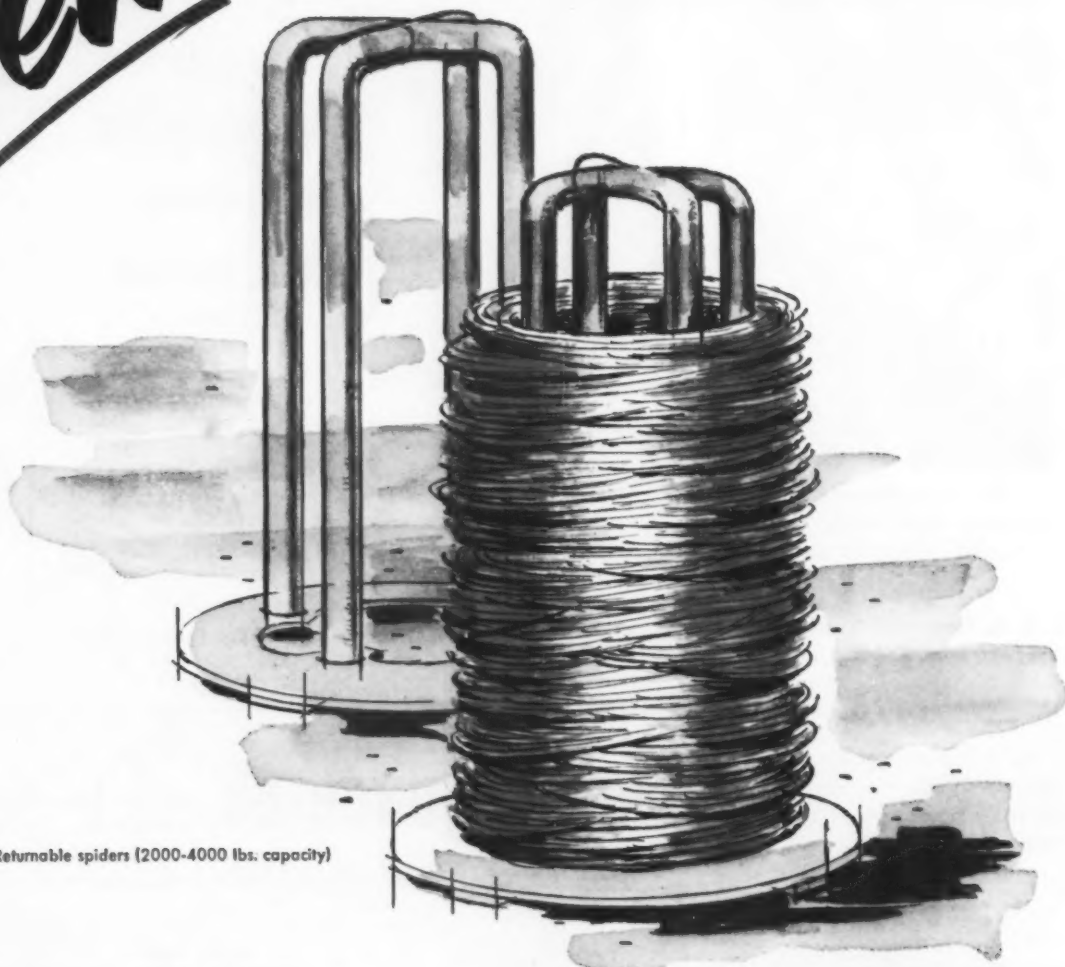
• Write for further information

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

51 a

New

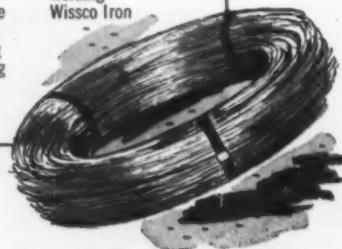
3000-4000 lb.



Returnable spiders (2000-4000 lbs. capacity)

Here is a partial list of the many types of carbon steel wire manufactured by CF&I:

		Standard Types (partial list)			
Grades	Finishes				
low carbon	bright dry drawn or	aircraft cord	fuse	merchant	square
annealed	lime bright	bee	Gamma spring	nail	stapling
flat and shaped	bright grease drawn	bobbie ring	garment hanger	oil tempered	staple
	cadmium coated	bobby pin	glass netting	picker tooth	stone
medium high carbon	coppered	bookbinder	hair pin	picture cord	tie
	extra clean	broom	hat	pin ticket	twisted & laid
high carbon	smooth bright	brush	hose,	regulator	upholstery
flat and shaped	galvanized	casing	reinforcement	rope	valve spring
oil tempered	liquor	clip	hose, mechanical	safety pin	weaving
spheroidized	white liquor	concrete	hose, vacuum	screen	welding
		reinforcing tie	lock spring	shaft, flexible	Wissco Iron
		cotter pin	lockwasher	Signal Corps	
		curtain spring	manufacturers'	snake fishing	
		die spring	drawn	spiral binding	
		fine & weaving	mattress	spring	



Steel strapped coils (200-2000 lbs.)

WHEN YOU NEED WIRE... MAKE

CONTINUOUS WIRE "SPIDER"

... cuts downtime as much as 15%

... reduces scrap loss

Here's what CF&I's new giant package did for one upholstery spring manufacturer who had been using 700-lb. wire coils:

- Downtime was reduced
- Production was increased 15% per shift
- Men and materials handling equipment were freed for other work
- Scrap losses were reduced

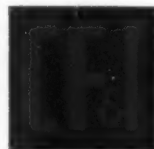
These returnable spiders will cut your

production costs, too. If your manufacturing process is not equipped to use spiders, order our 200-2000 lb. continuous-length, steel-strapped wire coils. (Sizes #13 AWG and coarser apply for both spiders and coils.)

From spools to spiders . . . CF&I's newly modernized and enlarged plants are equipped to provide fast delivery on high or low carbon steel wire . . . round, flat or shaped . . . in a wide variety of sizes, tempers, grades and finishes . . . in small quantities or carload lots. Let us know your requirements.

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WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York
Philadelphia • CF&I OFFICES IN CANADA: Montreal • Toronto • CANADIAN REPRESENTATIVES AT: Calgary
Edmonton • Vancouver • Winnipeg



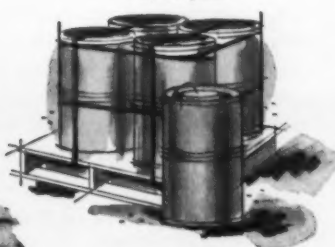
Other CF&I standard packaging methods



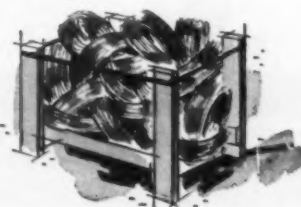
Reels (500-800 lbs. capacity)



Pay-off paks



Steel strapped wooden rack



Non-returnable spiders (500-700 lbs. capacity)

5758

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You may have met the man in the middle—

He is one of our C/R Sales Engineers. He, or one of his associates, may have been in your plant many times. Here, he's shown helping to check the installation of a C/R oil seal on a Detroit automotive assembly line—*after the seal design has been approved for production*. He wants to make absolutely certain this seal is installed correctly to assure maximum performance and service.

This personal supervision of skilled oil seal engineers and their careful attention to detail, typify every phase of research, design, production and testing of C/R Oil Seals. It accounts for the recognition C/R has earned in sealing applications. And it is a major reason why more automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device.



If you have a sealing problem, critical or simple, bring it to Chicago Rawhide. C/R engineers will help you select the correct oil seal of existing types or will cooperate with you on a special design.

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C/R PRODUCTS: C/R Shaft and End Face Seals • Sirvene (synthetic rubber) molded pliable parts • Sirvis-Conpor mechanical leather cups, packings, boots • C/R Non-metallic Gears



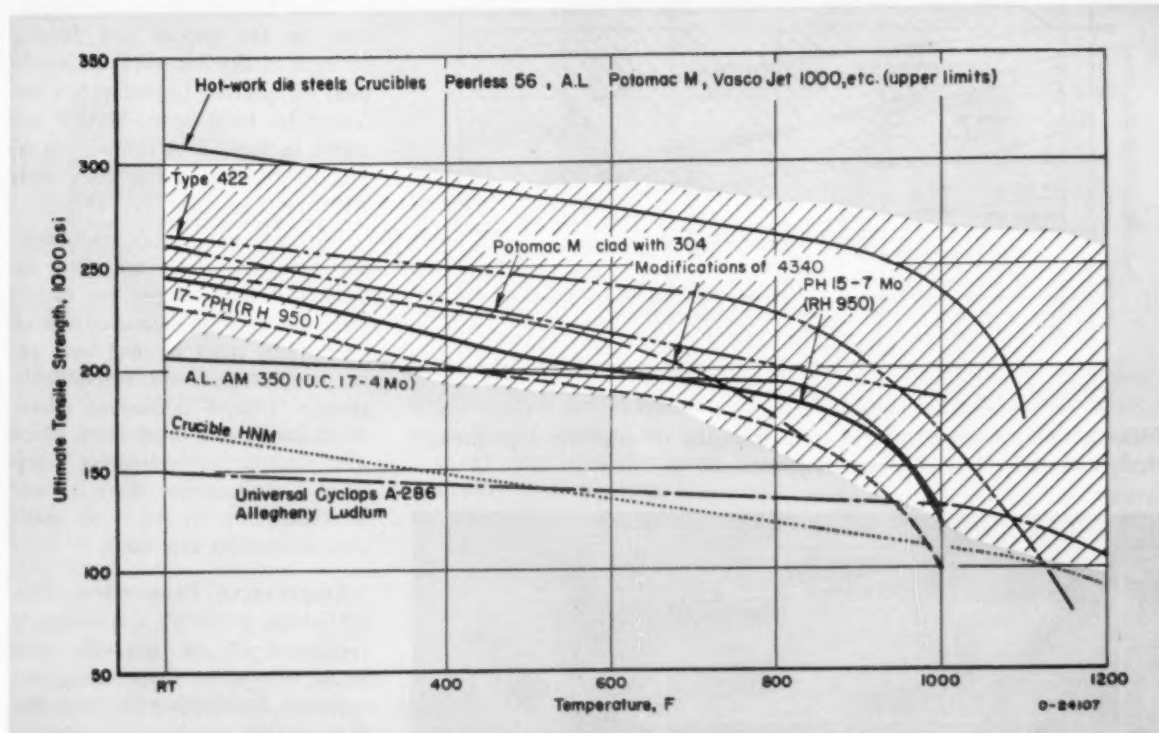


FIG. 1: Comparison of typical tensile strengths of presently available steels with airframe needs.

Survey Hot-Work Tool Steels For Aircraft and Missiles

Part 1

By R. J. Nekervis, C. H. Lund, and
A. M. Hall, Battelle Memorial
Institute, Columbus, O.

In many respects, hot-work tool steels show great promise for the aircraft and missile applications of the future. That's why some of these steels are being rolled in sheet form.

This survey, based on information from both producers and users, rounds up the important properties of these key materials.

Why are hot-work tool steels of particular interest to manufacturers of aircraft and missiles? Principally because these materials resist softening at high temperature to a much greater extent than do the conventional high-strength steels.

Add to this the fact that they can be tempered at much higher temperatures than the conventional steels for the same level of strength. The combination of resistance to softening and the extremely high strengths obtainable underline the potential of hot-work tool steels for a variety of aircraft and missile applications.

Complete Picture—But although

these steels have very definite advantages, they also have their limitations. To obtain the complete picture of their properties and fabricating characteristics, Battelle Memorial Institute recently surveyed the experience of both suppliers and users. This information was further augmented by a review of the published literature and suppliers' data sheets. The program was

Part 2 of this survey, covering consumers' views as well as manufacturing practices and problems, will appear in next week's issue.

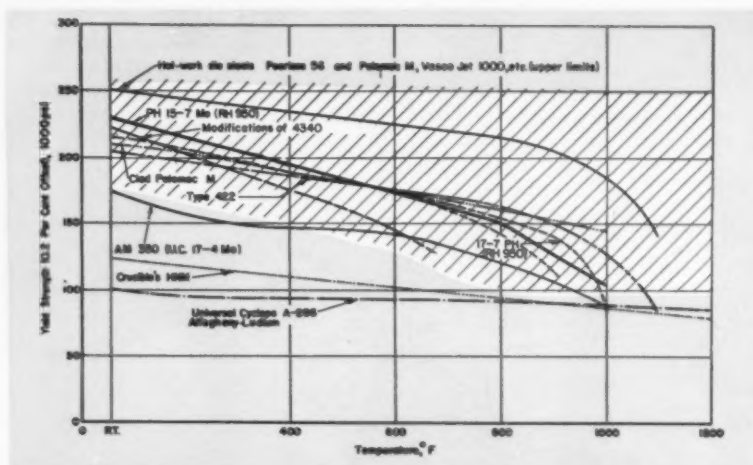


FIG. 2: Comparison of typical yield strengths of available high-strength steels with airframe and missile requirements.

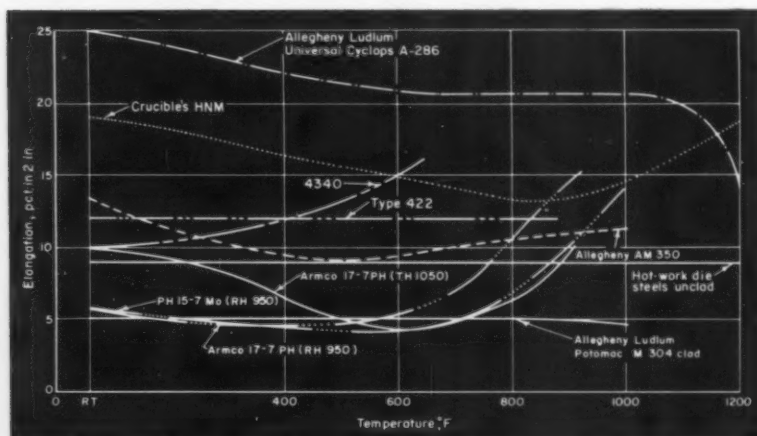


FIG. 3: Plotted are typical ductility values for a variety of presently available steels for use in airframes and missiles.

sponsored by the Department of Defense.

Three charts (Figs. 1-3) serve to summarize the tensile properties of the general classes of hot-work tool steels carrying the AISI designations of H-11, H-13. They actually relate to the somewhat more highly alloyed proprietary steels, Potomac M, Peerless 56, and Vasco Jet 1000.

High Temperature Strength—There are a host of proprietary hot-work tool steels, all containing 5-7 pct chromium, 0.35-0.55 pct carbon, and various combinations of vanadium, tungsten, and molybdenum. The last three elements are intended to confer additional high-temperature strength. Some of these

steels also contain nickel. Compositions are given in Table 1.

At this stage of development, it appears that the airframe builders would prefer to use the medium-carbon, nickel-free alloys—other things being equal. To begin with, there is less decarburization with the lower carbon grades. Secondly, nickel is undesirable because it tends to lower the M_s temperature drastically, causing excessive quantities of austenite to be retained.

Avoid Retained Austenite—Unfortunately, austenite is retained even after multiple tempering. It is subject to transformation to brittle martensite under shock or fatigue loading at very low stress levels.

In operation, such transformation could result in brittle fracture.

There is little information available on the impact and fatigue strength of the hot-work die steels used for aircraft. Impact values for Vasco Jet 1000 up to 1200°F are shown in Table 2. A comparison of fatigue strength of this alloy with AISI 4340 is shown in Table 3.

Rupture strengths of individual hot-work tool steels are given in Table 4. Where comparisons of the creep-deformation characteristics of the various types of steel were attempted, information is unavoidably sketchy. Use of isochronous stress-strain curves is a much more effective method for presenting creep data. Unfortunately, there is not sufficient data available to make comparisons on this basis.

Impressive Properties—The 1000-hour (1000°F) stress-rupture properties of the hot-work tool steels are quite impressive and compare favorably with even the precipitation-hardenable austenitic stainless grades. For example, Allegheny's Potomac M indicates a hot strength of 83,000 psi. This compares with 60,000 psi for both Crucible's 422M and Timken's 17-22AS. Slightly better than the tool steels in this respect is A-286, with a value of 87,000 psi.

Under the same conditions of temperature and time, the hot-work tool steels do not compare so well as regards creep deformation at low strain rates.

In addition to providing high-temperature strength at a relatively low cost, hot-work tool steels have other important advantages. Air hardening, they do not distort as much in heat treatment as do the low-alloy steels such as 4340. Thanks to higher chromium content, the oxidation resistance of hot-work die steels is somewhat better than that of the low-alloy steels. Also, there is less tendency toward decarburization.

Less Weld Cracking—They have satisfactory fusion welding characteristics as compared with other

TABLE 1. Compositions of Hot-Work Tool Steels

Steel	Composition, pct						
	C	Mn	Si	Ni	Cr	Mo	V
Peerless 56 (Crucible)	0.40	0.55	1.00	—	3.25	2.80	0.35
Potomac M (Allegheny Ludlum)	0.40	0.35	1.00	—	5.25	1.25	1.00
Haimo (Crucible)	0.35	0.28	0.72	—	5.16	5.14	0.66
Vasco Jet 1000 (Vanadium-Alloys)	0.40	0.30	0.90	—	5.00	1.30	0.45
Thermold J (Universal Cyclops)	0.50	0.35	1.10	1.40	5.00	1.30	1.00
Potomac A (Allegheny Ludlum)	0.40	0.30	0.90	—	5.00	1.30	0.50

martensitic steels. Welded Vasco Jet 1000 sheets, 0.078 and 0.063 in. thick, heat treated to a 260,000- to 280,000-psi tensile strength easily took a 180-degree bend. These steels show less tendency to weld cracking than do the low-alloy constructional steels.

They are not notch sensitive. Freedom from notch sensitivity in this case means that the notched specimens have higher tensile strengths than unnotched specimens. For example, Peerless 56 has higher tensile values in the notched state at room temperature and 1000°F than do unnotched Peerless 56 specimens.

They're Not Stainless—In the soft condition, hot-work tool steels can be stretch formed. North American Aviation (Columbus) brake formed and Hydropress formed a considerable amount of steel of this class.

Probably the major disadvantage

of hot-work die steels is that they do not contain enough chromium to make them stainless. As yet, they have not been used in exterior applications such as skins. Cladding them with austenitic stainless results in a marked reduction in strength. (Fig. 3).

When Potomac M sheet (0.065 in. thick) was clad 6-7 pct on each side with 304 stainless, reduction in strength was of the order of 40-50,000 psi from room temperature up to 800°F. While the reduction is appreciable, the resulting strength is still quite impressive.

Can Be Clad—This steel, clad with 10 pct 304 stainless (5 pct on each side), has shown room temperature strengths as high as 270,000. At 800°F, 200,000-psi tensile strengths have been reached. Above 800°F, the spread between these clad and unclad steels becomes less.

This is expected since the strength of the austenitic steels does not drop off appreciably in this temperature range.

Another approach to the corrosion and oxidation-resistance problems involves hot-dip aluminizing. It was recently reported that the hot-work die steels can be aluminized in a bath of molten aluminum at 1350°F.

The part can be heat treated and the coating diffused at the same time, since a temperature of 1850°F takes care of both. Other coatings, particularly diffused cadmium-nickel coatings, also show promise. Properties of aluminized Vasco Jet 1000 are given in Table 5.

Less Distortion—Hot-work steels require jiggling during heat treatment. In this respect, they are not as bad as other martensitic steels

TABLE 2. Impact and Modulus-of-Elasticity Values for Vasco Jet 1000 at Elevated Temperature^(a)

Test Temperature, °F	V-Notch Charpy Impact Strength, ft-lb	Modulus of Elasticity, 10 ⁶ psi
70	21.0	30.4
300	27.1	27.7
500	30.4	26.2
650	32.0	27.7
800	31.8	27.3
900	29.3	27.0
1000	30.5	22.6
1100	33.2	21.0
1200	59.1	16.5

(a)—Test material initially tempered at 1000°F to hardness of 50 Rc.

TABLE 3. Fatigue Strength of Vasco Jet 1000 and AISI 4340^(a)

Fatigue Life, cycles	Safe Design Stress, psi	
	Vasco Jet 1000, 260,000 psi Tensile	AISI 4340, 260,000 psi Tensile
10,000	205,000	185,000
50,000	170,000	145,000
100,000	155,000	125,000
1,000,000	135,000	100,000
10,000,000	130,000	95,000
100,000,000	130,000	—

(a)—Standard R. R. Moore rotating-beam tests on 0.20-0.30-in. diam specimens from production bars, 1/2 in. in diam for Vasco Jet 1000 and 1/2 in. in diam for 4340.

with respect to distortion since they are air hardening.

In general, the hot-work steels are not notch sensitive. Still, some of the aircraft producers have indicated that the 5 pct Cr—1 pct Mo grade, in particular, may be subject to brittle fracture under the conditions of biaxial stresses below the tensile yield strength. Further, the bend ductility appears to be below normal requirements for pressure-vessel-type applications.

Microstructure characteristics, such as free carbide phase distribution, particularly at grain boundaries, is potentially a contributory cause of low notch toughness or increased crack-propagation tendencies. Optimum austenitizing and tempering temperatures for a given heat may provide a substantially carbide-free, fully martensitic microstructure which tends to minimize notch sensitivity.

Making Sheet—Most producers are engaged in the development of fabricating techniques for the production of sheet from hot-work tool steel compositions. They are also in the process of furnishing design specifications needed by the industry. Vanadium-Alloys Steel Co., for example, now guarantees certain transverse properties for Vasco Jet 1000.

The same company is currently developing Vasco X4 and Vasco X8 as flat-rolled sheet. The latter alloy in bar form shows good room-temperature yield strength (228,000 psi) and elongation (8.8 pct), when tempered at 1000°F. Under the same conditions, its ultimate tensile strength is 287,000 psi.

Vasco X4 is designed for high strength and stability at higher temperatures. Recent tests at 1150°F on material tempered at 1200°F (Rc 45) gave a yield strength of 80,000 psi (125,000-psi UTS) and 7 pct elongation.

Research Continues—Allegheny Ludlum Steel Co. has three current experimental alloys in which the effectiveness of tungsten, vanadium, and molybdenum additions—as well as varying carbon contents—are being investigated. A high-vanadium, high-tungsten die steel (B-47) has high elevated temperature strength and is being experimentally rolled into sheet. At 1100°F, it shows a yield strength of 188,000 psi and an ultimate strength of 210,000 psi.

A semi-high-speed steel (HTB-2), containing molybdenum and vanadium has better high-temperature strength but low ductility. At 1000°F, its yield strength is 250,000 psi and its ultimate strength is 309,000 psi. A lower carbon alloy

containing molybdenum and tungsten is being tested in an effort to boost elongation.

Check Higher Carbon—Crucible Steel Co. is developing Peerless 56 in sheet form. It is also continuing work on the Halmo and Halcomb 218 types. Jessop Steel Co. is developing a high-carbon alloy containing molybdenum and vanadium that is as yet neither named nor tested.

Carpenter Steel Co. has two variations of a Mo-V die steel called 882 Mel-Trol and 883 Mel-Trol. Tempered at 1000°F to a hardness of Rc 54, the latter alloy shows a 182,000-psi yield, 220,000-psi ultimate, and 13.2 pct elongation. These values were obtained at a testing temperature of 1000°F.

Universal Cyclops' Thermold J is being tested in sheet form. Recent tensile tests on bar-stock material show a typical room-temperature strength of 300,000 psi with 5.7 pct elongation when tempered to Rc 54 at 1000°F. The same material tested at 1000°F gave 202,000 psi as the typical tensile strength.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

TABLE 4. Creep-Rupture Strengths of Several Hot-Work Tool Steels at 1000°F for 100, 200, and 1000 Hours

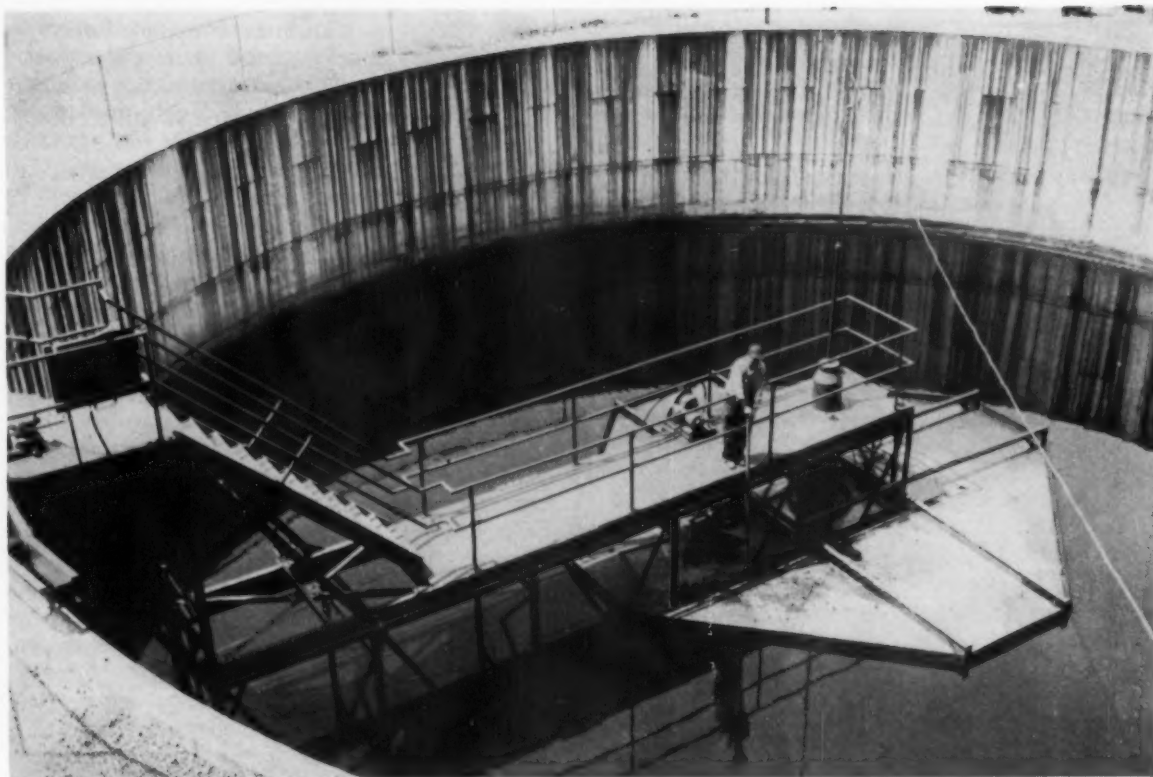
Steel	Tempering Temperature, °F	Hardness Range, Rc	Creep-Rupture Strength, 1000 psi		
			100 Hours	200 Hours	1000 Hours
Halcomb 218	1050	51-53	86	—	—
Halcomb 218	1100	46-48	82	—	—
Vasco Jet 1000	1050	50-52	88	76	—
Vasco Jet 1000	1100	46-48	82	76	—
Thermold J	—	—	—	50(a)	—
Potomac M (bar)	1025	—	105	—	85
Halmo	1050	51-53	126	—	—
Halmo	1100	46-48	113	—	—
Peerless J	1050	52	124	—	—
Peerless J	1100	52	121	—	—

(a)—Estimated.

TABLE 5. Tensile Properties of Aluminized Vasco Jet 1000^(a)

	Tempered at 1000 F (290,000 psi Level)		Tempered at 1050 F (260,000 psi Level)	
	Aluminized	Uncoated	Aluminized	Uncoated
Tensile Strength from Specimen Diameter, psi	271,000	—	244,000	—
Tensile Strength from Core Diameter, psi	285,000	290,000	256,000	268,000
Yield Strength from Specimen Diameter, psi	215,000	—	203,000	—
Yield Strength from Core Diameter, psi	226,000	235,000	215,000	226,000
Reduction of Area, per cent	26.0	28.1	35.9	31.9
Elongation, per cent	7.6	7.8	9.6	8.5

(a)—Comparison in triplicate, of aluminized (0.008-in. case depth) and uncoated 0.605-in. specimens, air cooled from 1800°F and tempered 2½ plus 2½ hours.



FOR CHEMICAL SLUDGE: Sludge collector in a chemical plant gently moves solids to sump in tank center.

What to do About the Growing Water Problem

Industry's water needs are expected to double by 1975. Yet, the available supply will stay about the same as today.

That's why it's important to consider means of making this vital resource go further—and to do it now, before the problem becomes more critical.

■ Water supplies today are just about what they were 50 years ago. But water demands of increasing population and industrial expansion have focused new attention on ways to make more efficient use of the supply.

More than 80 billion gal of water is needed to slake the daily

thirst of American industry. About 65,000 gal are needed to produce a ton of steel, 320,000 gal for a ton of aluminum, 600,000 gal for a ton of synthetic rubber.

Yet, this staggering thirst can be quenched successfully, because our present supply of industrial water may be reused indefinitely if solids and wastes are removed. At the same time, processing improves waterways by combatting stream pollution; in many instances, it also serves as an economical way to salvage valuable by-products.

Film Tells How—A new Link-Belt Co. motion picture, "Pure and Simple," demonstrates how industrial water problems of many types

can be solved. The film spotlights specific water problems of five major industries—steel, chemical, pulp and paper, petroleum and food processing—and shows how these problems are solved through proper use of sanitary engineering equipment.

Four industrial water problems are discussed in the new film; combatting stream pollution, salvaging by-products, recirculating water for reuse, and waste treatment in areas where plants have to be self-sufficient.

Industry's problem of combatting stream pollution requires meeting the broad public interest—by keeping rivers and streams from growing so polluted that they no longer

"Pure and Simple" has a running time of 19 minutes. The film is available on letterhead request only for free showing in the United States to companies or sanitary engineering organizations concerned with industrial waste problems. Write to the Public Relations Dept., Link-Belt Co., Prudential Plaza, Chicago 1.

serve the needs of neighboring communities or other industries. To keep this pollution from becoming a health hazard, community nuisance or individual hardship, the waste that industry adds to streams and rivers must be treated.

At a chemical plant that had to face cleaning up wastes or pay excess city sewer surcharges, the problem centered on extracting large quantities of chemical solids from waste water. Link-Belt supplied a Circuline collector, which is a 200,-

000-gal settling tank that provides quick removal of settled solids from the entire tank floor. The system functions as an integral part of plant operations.

An oil refinery had to remove oil waste from water to comply with state pollution regulations. At this installation about 45,000 bbl of petroleum are produced daily, and primary separators have been built to handle 15,000 gal of waste water per minute.

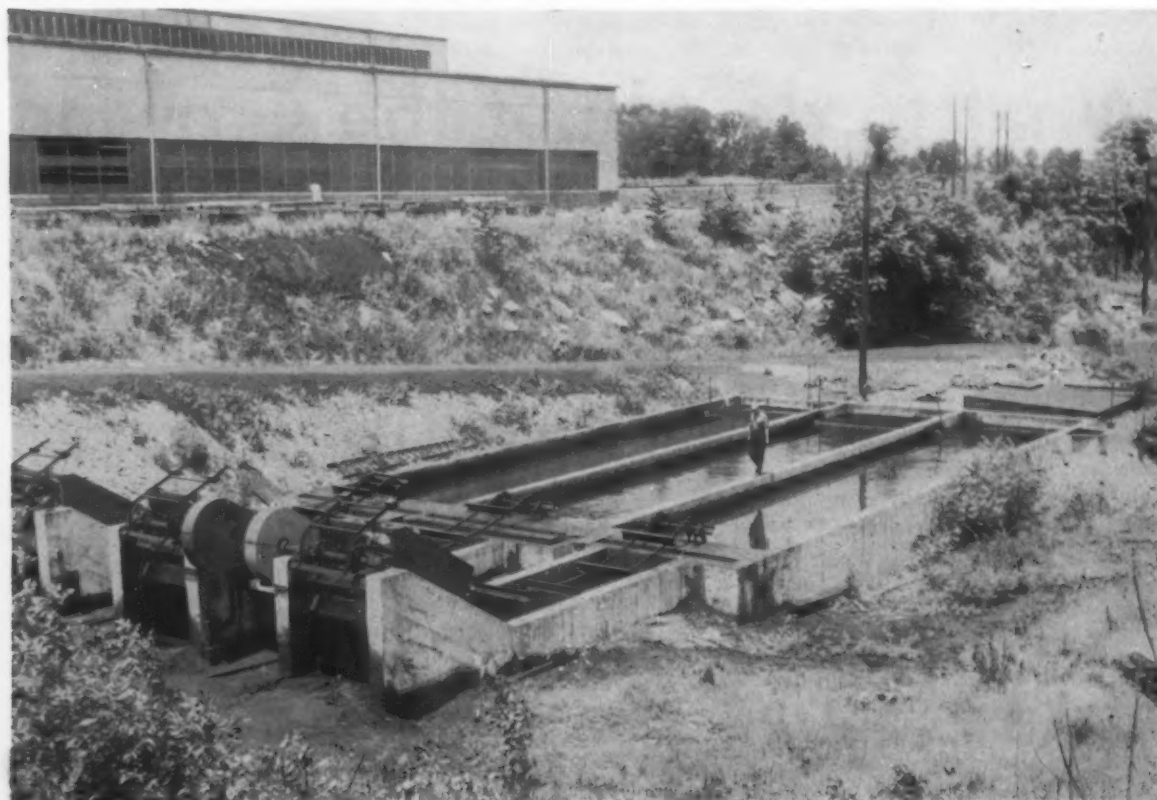
Oil is Reusable—Waste at this installation is composed of water used for refinery cooling operations, washdowns of process equipment and machine oil drippings. Primary separators remove oil from the water at an average of 200 bbl a day—and this oil is again processed for reuse. One common outlet flume handles the effluent from six oil-water separators, discharging clean water to the neighboring stream.

To control overflow caused by heavy rainfall, an impounding basin of earth-fill construction was built alongside the collecting flume. Waste flows from the 110-acre drainage area to the primary separator by means of this flume.

The question of whether a pollutant should be segregated and treated at the source or put into the sewer and be treated at a municipal sewage treatment plant depends on many factors.

Approaching waste treatment and purity studies as realistically as possible, Link-Belt sanitary equipment engineers recommend: recognition of a pollution problem where it exists; sampling and study to determine the nature of the problem; gathering control data through pilot plant studies to determine how the problem can be eliminated or controlled; and application of control data to engineering and development of a treatment process.

The second aspect of industrial



VALUABLE BY-PRODUCT: Three Link - Belt Straightline collectors recover tons of mill scale daily

at an eastern steel mill. The scale is about 72 pct pure iron, too valuable to lose down a sewer.

water treatment covered in the film concerns salvage of valuable by-products. Preventing useful materials from entering sewers and eventually natural waterways can be the most economical and efficient method of industrial waste control.

At a modern steel mill, tons of iron in the form of mill scale are salvaged from processing water daily.

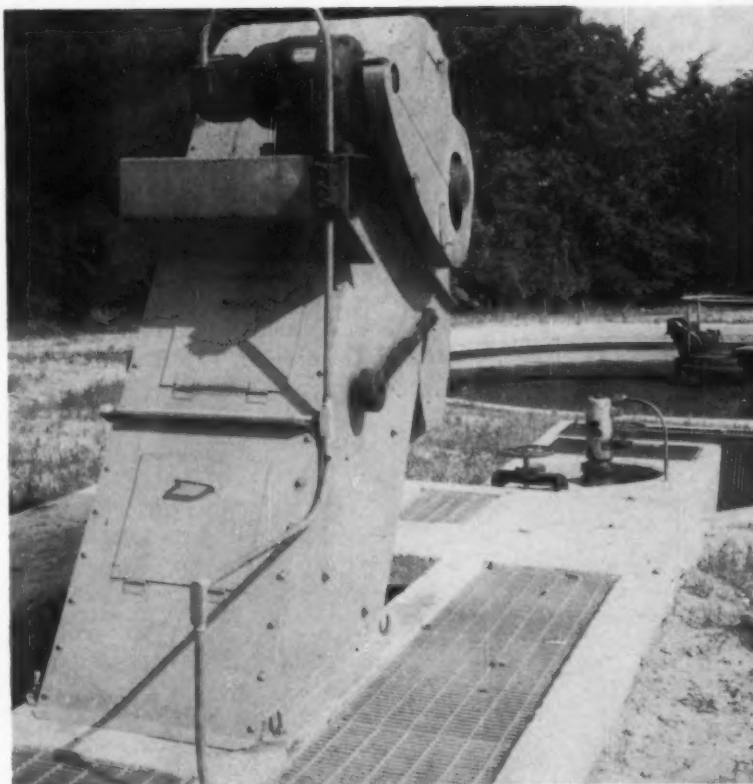
Since mill scale is about 72 pct pure iron, each ton is equivalent to one and one-half tons of iron ore. In the past, much of this mill scale went down the sewer, despite attempts to reclaim it by diverting the water into sludge pits. Scale was removed from the sludge pits by bucket cranes. Only about 50 pct of the scale was recovered; the rest passed into the sewers, where it caused frequent clogging.

With a system of Link-Belt Straightline collectors travelling along the bottom of concentrator tanks, scale is now collected, dewatered and conveyed to waiting railroad cars. By the carload, it's taken to a sintering plant for fusing into larger particles before charging into blast furnaces.

Pays For Itself—In addition to recovering 97 pct of the mill scale, the Link-Belt system eliminates sewer clogging. More of the mill scale is being reclaimed than was originally expected, and resulting savings have paid for the installation many times over.

Advantages of a by-products salvaging system are: water and materials from the process often can be returned to the point of origin at a higher purity, so two-fold conservation is realized; more efficient use of basic materials (i.e. reuse of machine oil drippings, or water sprayed on fields for irrigation) can lower manufacturing costs; and installation of a by-products salvaging and waste prevention system often leads directly to technological improvements.

Waste prevention isn't important only as an economic asset in salvaging by-products; in many instances



ALL IN ONE: Tritor screen removes screenings and grit or detritus with just one machine, is ideal for small and medium-size plants.

it also assures adequate water supplies to fulfill the needs of an industry.

Industrial water use, in a broad sense, can be defined as either consumptive or non-consumptive. In many cases industrial water is non-consumptive in that most of the water used in the manufacturing process is ultimately discharged.

Agricultural needs, on the other hand, illustrate a consumptive use; water used for irrigation either evaporates directly or transpires through plant foliage and completely disappears.

Where water is scarce and untreated water can be used in processing, treated sewage can be bought from nearby communities. A West Coast steel mill that found itself without an adequate supply of surface water is now buying treated waste water from a nearby city; an eastern steel mill buys over 65 million gal of treated sewage a day.

In moving from metropolitan

areas, or locating at rural sites, many plants find it necessary to treat and dispose of their own liquid industrial and sewage wastes. In this regard, industrial sanitary waste treatment can be considered a part of manufacturing, and an industry becomes self-sufficient by providing its own waste treatment operation.

Typical is the Link-Belt plant at Colmar, Pa., located 25 miles from Philadelphia and isolated from a municipal sewer system. The sewage treatment setup at this plant is a primary and final settling tank, two filters, a digester, chlorination equipment and sludge drying beds.

Both the U. S. Department of Commerce and the President's Water Resources Committee report that the amount of water needed for industrial use will double by 1975. This means that in the future many industrial effluents that find their way to carry-off streams today will have to be treated at their sources.

How the CANEL Project Test Chamber Was Made

There's no room for second-guessing in this kind of work.

The vessel is a vital tool in development of atom-powered aircraft engines; it'll operate at high temperatures and pressures—and "hot" materials are involved.

■ Some unusual problems were met in making a test chamber for the CANEL Project (Connecticut Aircraft Nuclear Engine Laboratory) in Middletown, Conn.

The test chamber is big—about 40 ft long and 12½ ft in diam. It will be used in developing a nuclear-powered aircraft engine, and so has to operate at high temperatures and pressures. Design and construction were further complicated by the need for a large access opening—about 17 ft long and run-

ning half way around the circumference.

For these reasons, care was taken in selecting the structural materials. The designers — McConathy, Hoffman & Associates—finally chose T-1, a high strength constructional alloy steel made by Lukens Steel Co., Coatesville, Pa.

Factors which led to using T-1 were its high strength, the weight savings it makes possible, its good weldability, and lower total cost. Chemical composition of this ma-

Heat treatment normally involves water quenching from about 1650°F, then tempering from about 1250°F. Flat plate is routinely produced to the heat-treated properties listed in Table II. Heads for the test chamber had to be formed before heat treatment.

The designers specified that Cast No. 1204-3 of the ASME Unfired Pressure Vessel Code, Section VIII, be followed wherever possible in the construction of this vessel. Since T-1 is approved for pressure vessel

Table II | Properties of T-1 and A-201 Carbon Steel

	Lukens T-1 (ASME-UPV Case 1204-3)	A-201 Grade B, Firebox
Minimum Ultimate Strength, psi	105,000	60,000
Minimum Yield Strength, psi	90,000	32,000
Minimum Elongation in 2 in., pct	17	26
Design Stress, psi	26,250	15,000

Table I | Composition of Lukens T-1 (ASME-UPV Case 1204-3)

C	0.10-0.20
Mn	0.60-1.00
P, max.	0.035
S, max.	0.040
Si	0.15-0.35
Ni	0.70-1.00
Cr	0.40-0.80
Mo	0.40-0.60
V	0.03-0.10
Cu	0.15-0.50
B	0.002-0.006

Heat Treatment:

Water quenched from 1650-1750°F
Tempered at 1150-1275°F

terial is shown in Table I, and physical properties of T-1 are compared with A-201 carbon steel in Table II.

Permits Thinner Shell — With T-1, a shell thickness of 1¼ in. and heads 1½ in. thick were possible. If carbon steel plate had been used, shell thickness on the order of 2 in. would have been needed.

The vessel is reinforced with 1½ in. thick rings, mainly because of the large 180° opening. It's also insulated on the inside, and the insulation is protected by a stainless-steel liner.

The properties of T-1 stem in part from the fact that it is heat treated (quenched and tempered) after being rolled in plate form.

construction by this Code, the specification was used as a quality control standard.

Takes Careful Planning—Fabrication of the test chamber was handled by O. G. Kelley & Co., Boston. The firm developed procedures for both manual and automatic welding of T-1 in the course of becoming familiar with the material. Since total weight of the chamber exceeds 160 tons, each step had to be planned carefully as it moved through the shop during fabrication.

During all phases of the work, sound fabrication was insured through careful inspection. All welds were dye-penetrant checked

after the first and last pass. Whenever possible, welds were also X-rayed or radiographed.

After fabrication, the chamber was stress-relieved in a gas-fired furnace specially built by O. G. Kelley for this purpose. Stress-relieving was done at about 950°F, slightly lower than stress-relieving temperatures normally used for carbon steels. This lower temperature

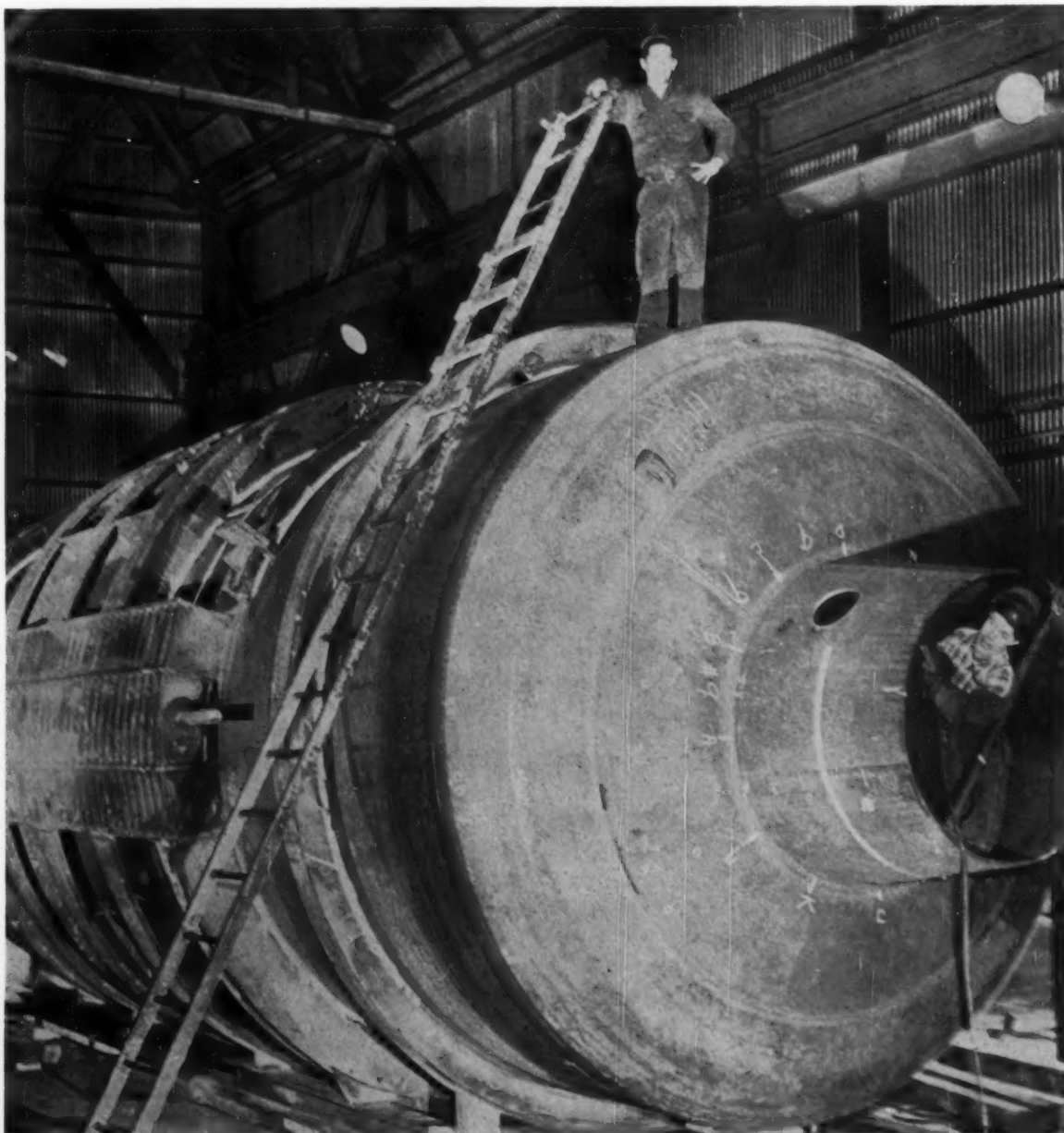
is necessary because T-1 is tempered at about 1250°F.

The final step was a hydrostatic test at the maximum operating pressure of 250 psi.

Big Weight Savings — Use of Lukens T-1 permitted a weight reduction of about 90 tons; if ordinary carbon steels had been specified, the vessel would have weighed more than 250 tons. This weight

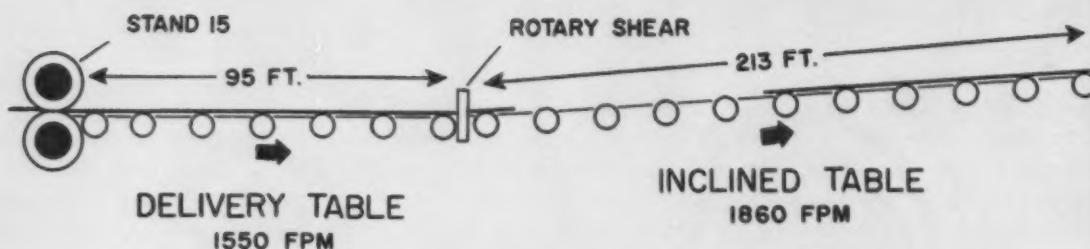
savings helped cut total cost and simplified handling, both in the fabricator's shop and during transportation from Boston to Middletown.

Over-all construction of the new facility is being handled for the Air Force by the Corps of Engineers, U. S. Army, New England Div. The CANEL Project is operated by Pratt & Whitney Div., United Aircraft Corp.



NO ORDINARY JOB: The reinforced test chamber measures 40 ft long and 12½ ft diam, weighs 160 tons,

and cost close to \$500,000. By using T-1 steel, designers were able to save something like 90 tons.



Is Your Lube Oil Giving You Top

Said to be the largest centralized aerosol lubrication system in the steel industry, this one handles a total of 770 parts: 576 plain bearings, 188 gears and 6 drive mechanisms.

And it does all this on little more than a quart of oil per hour.

■ A noteworthy feature of the expansion and modernization program at Colorado Fuel & Iron Corp. is the cooling unit on the Morgan rod mill at Pueblo, Colo.

Completely designed and built by CF&I, the new setup consists of a 95-ft long delivery table, a 213-ft inclined table, 270-ft double cooling beds, escapement racks, a 290-ft runout table and surge cradle—all of which extends more than 700 ft beyond the No. 15 stand in the rod mill. It'll produce $\frac{3}{8}$ and $\frac{1}{2}$ -in. diam straight bars and release a 10-in. mill for heavier production.

Continuous, double strands of red hot bars come out of the No. 15 stand in the rod mill. They travel at an average speed of 1550 fpm over the covered delivery table, through rotary shears and up the inclined roller table to the cooling beds.

Photo electric tubes are located at the entry of the cooling beds. They actuate the rotary shears at

the end of the delivery table, cutting the bars into 240-ft lengths. To prevent overlapping of bars at the shears, the inclined table moves at 1860 fpm — 310 fpm faster than the delivery table—so bars surge ahead at a faster speed the instant they are cut.

Automatic Handling—Bars move over the top of the cooling beds on a series of slightly tapered rollers. As the leading ends pass another set of electronic devices near the far end of the cooling beds, kick-off arms eject the bars from the conveying rollers onto a series of straightening pockets.

Lift fingers then place the bars on escapement racks which lower them slowly to the shuffle bars and onto the run-out table. Regularly spaced rollers on the table carry the

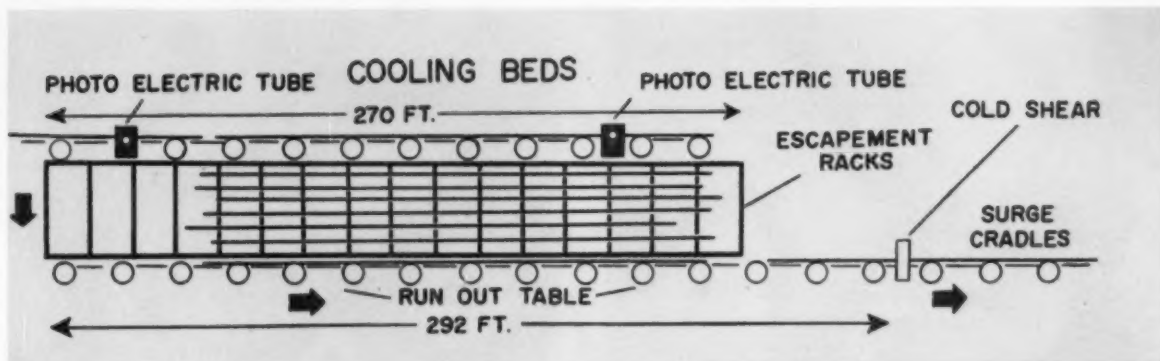
bars to cold-finishing shears, which finally cut them to specified lengths.

When the twin cooling beds were being developed, studies were made of all known centralized lubrication systems—grease and oil pumping systems, metering and continuous types, as well as fog and spray systems. The airborne method was finally chosen; large-capacity Micro-Fog lubrication units made by C. A. Norgren Co., Engelwood, Colo., were already operating successfully in other divisions of the firm.

Critical Area — The major part of Micro-Fog lubrication is at the twin cooling beds. Performance there is critical, so special attention was given to lubricating line shafts, kick-offs, lifters, shuffle bars, table rollers, gearing, table drives and shuffle bar drives.

Parts Lubricated by Micro-Fog

Location	Number and Type	Diam and length, in.
Kick-off	74 bronze bearings	3 x 6
Shuffle Bars	56 babbit bearings	2 $\frac{1}{16}$ x 5
Shuffle Bars	108 eccentrics	5 x 2 $\frac{3}{4}$
Lifters	56 babbit bearings	3 x 5 $\frac{3}{4}$
Lineshaft	94 babbit bearings	3 x 5 $\frac{3}{4}$
Table Rollers	188 babbit bearings	2 $\frac{1}{2}$ x 4 $\frac{1}{2}$
Open Bevel Gears	94 pairs (26 teeth)	1 $\frac{1}{4}$ c. p. x 2 $\frac{1}{2}$ face
Table Drives	4 drives (25 hp)	
Shuffle Bar Drive	2 drives (35 hp)	



KING SIZE COOLER: Twin-bed cooling unit built by Colorado Fuel & Iron for its Morgan rod mill measures more than 700 ft in length.

Mileage?

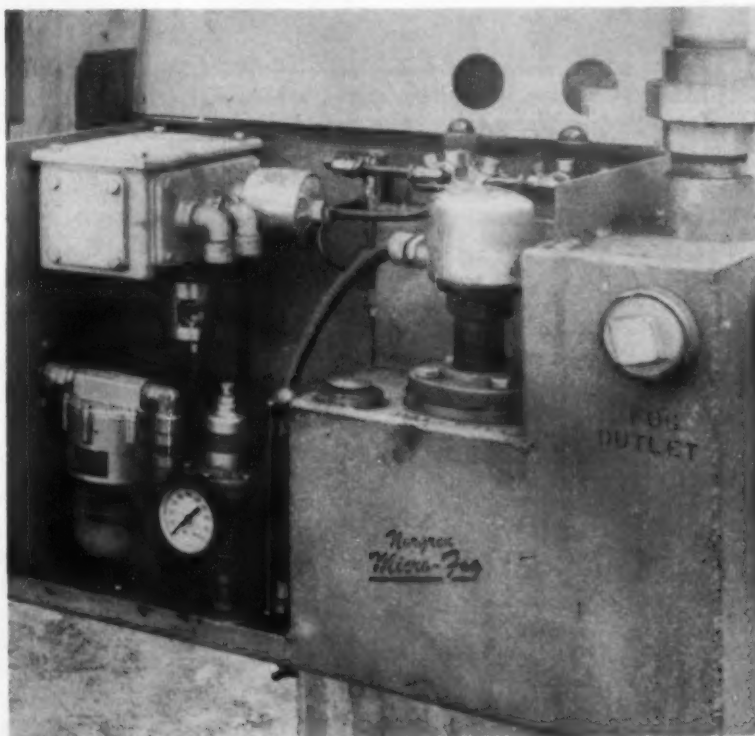
Parts lubricated in this way include 576 plain bearings, 188 bevel gears and 6 drive mechanisms, including spur gears and anti-friction bearings. A breakdown according to type, size and location is listed in the accompanying table.

Four large-capacity, 1000-bearing-inch Micro-Fog lubrication units of the cabinet type (Model 33AB-4) are used. They are centrally located under the cooling beds and serve seven headers.

What's Inside — Each Norgren unit has an automatic-drain air-line filter to remove moisture and solids from the air stream and prevent contamination of the lubricant; an air pressure regulator to maintain proper working pressure in the system; and a Micro-Fog Lubricator of 4½-gal oil capacity to provide controlled lubrication.

Inlet connections to the lubrication units are ½ in. pipe and the fog outlet is 2 in. pipe. Manifolds are 1¼, 1½ and 2 in. pipe. Lines from the manifolds graduate from ¾ in. pipe down to ¼ in. copper tubing at the points of application.

A total of 878 reclassifiers is used. They are of two types — straight pipe connections at all plain bearings and solder type connections at all gearing on line shafts, table drives and shuffle bar drives. Because the installation is in the open and unprotected from



SYSTEM'S HEART: Four Norgren Micro-Fog cabinets serve the entire double cooling bed section. Each contains an automatic-drain line filter, air-pressure regulator and 4½-gal capacity lubricator.

weather, CF&I men plan to install heating for the lubrication units.

Needs Little Air—Regulated air pressure of 60 psi is carried in the lubrication system. Air consumption is only 108 cfm.

A safety feature of the Norgren lubrication units is an alarm setup to warn of certain conditions which may affect lubrication. If air pressure should fail, or if the oil supply

needs replenishing in any one of the four units, a red warning light turns on at the operator's station. The light is operated by a pressure switch and liquid level control.

The lubricant used is 300-second lead naphthenate oil. The amount needed to continuously lubricate all 576 bearings, 188 gears and 6 drive mechanisms while in operation is only 1¼ qt per hour.

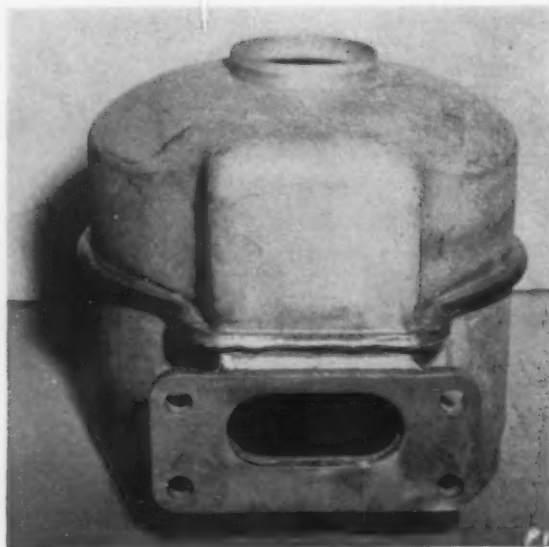


FIG. 1: Arc-welded pressed-steel assembly, left, weighs only 11½ lb; iron casting formerly used, right, weighed



26¼ lb. White spots on the casting are blow holes that were repaired by cold-soldering.

Welded Air-Cleaner Assembly Makes for Big Savings

By W. E. Meagher—Welding Engineer, Donaldson Co., Inc., St. Paul.

In many cases a part can be made by several different methods. While the advantages vary, it's often a toss-up between a casting, forging, or weldment.

But sometimes the benefits of one so far outweigh the others that the choice becomes clear-cut. This weldment reduced total costs 36 pct.

■ Reduction in weight of 56 pct, unit cost saving of 35.8 pct and a cut in manufacturing rework from 25 pct to 3½ pct; all three were realized by a change from soldered cast iron to arc-welded pressed steel air cleaners for Caterpillar construction and mining equipment.

Produced in five somewhat different designs, the cleaners are

basically a 9-in. diam cylindrical body attached to a central cover shell carrying a mounting flange and a top dome or cover with a 2½ in. neck for the intake tube. Originally the two elements of the dome were made as a single gray iron casting weighing 26¼ lb. Connections to the center tube and lower body were soldered, which required first dip-tinning the casting.

Leaks in the soldered joints, along with pinholes and porosity in the casting after machining, ran as high as 25 pct during 10-lb air pressure testing; subsequent cold-soldering repairs had to be made. Beyond this, breakage of castings in handling and transporting often ran up to 5 pct.

Uses Drawn Shells—In the redesign for welded steel, Fig. 1, the

dome shells are formed as in Fig. 2 from two flat blanks of 12-gage hot-rolled pickled and oiled steel.



FIG. 2: Upper half of the air-cleaner cover is formed in a single draw from a decagon-shaped blank of 12-gage steel.

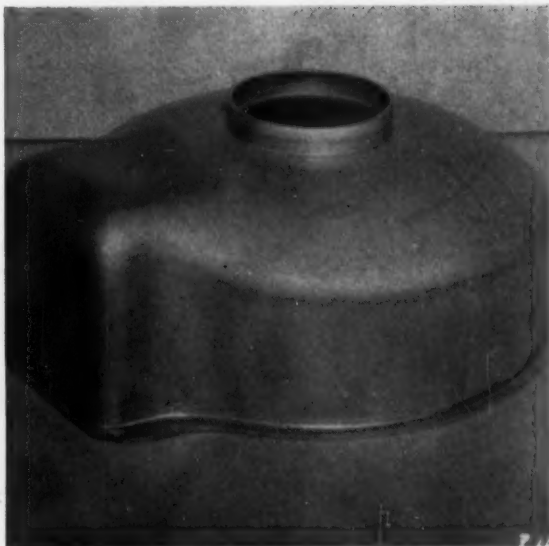


FIG. 3: The two halves just before welding. Dome has been punched and drawn for welding to neck tube;



lower half has slightly wider flange as shelf for weld metal. Side opening is for mounting flange.

After a trim and punch, they're submerged-arc welded automatically with a lap joint, Fig. 3, at the formed flange. The center tube is welded to the formed neck in the same way.

At first, dome sections were joined to the 20-gage steel body by resistance seamwelding; but later studies showed that submerged-arc welding, with a specially designed electrode "nozzle" cocked at an angle for inside welding, is more practical. The welded assembly weighs only 11½ lb.

The seam between the dome sections isn't circular; it has an offset directly above the mounting flange. This called for a specially designed welding fixture and head, arranged as in Fig. 4 so that the part is turned under the head. A cam operates through sprockets and chain drive to follow the offset accurately under an electrode point set roughly at the 2 o'clock position.

Parts Are Standard—Welding head, controls and generator are standard types. Welding wire is 3/32-in. and travel speed is 68 ipm, giving a 30-second welding cycle on the 34-in. joint. The flange on the lower member is trimmed to



FIG. 4: Cover halves clamped in fixture are rotated under stationary submerged-arc welding head. The 34-in. weld takes 30 seconds.

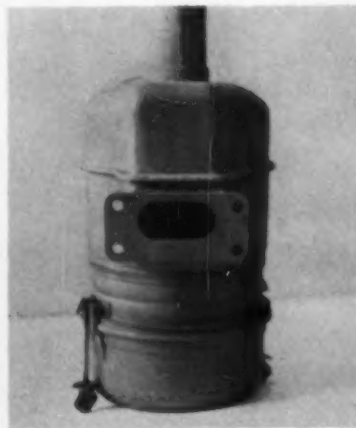


FIG. 5: Finished air cleaner with neck tube attached and lower body shell welded to the upper dome assembly. Five types are made.

3/32 in. diam greater than on the upper dome, providing a shelf to retain weld metal. A mounting flange of ½-in. steel plate is manually arc welded to the offset on the lower half of the cover. It has four drilled holes for attachment to the engine's intake manifold.

A completed air cleaner is shown in Fig. 5. Current annual output is on the order of 7500 units.

Five submerged-arc welding units have now been installed to maintain production needs on the three girth joints of five different models.

■ This article is based on an award-winning paper submitted in the recent Machine Design Competition sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland.

One-Part Adhesive Saves Bonding Steps

By E. F. Hess—Product Manager, Adhesives, Coatings & Sealers Div., Minnesota Mining & Mfg. Co., Detroit

Cutting steps from a process can widen scope of application.

That's just what's being done with high-strength resin adhesives. A new development eliminates the need for activating.

Unlimited working life puts new light on bonding techniques.

■ A new one-part adhesive forms a high-strength metal-to-metal bond with no chemical activator needed. It's an epoxy resin that boasts unlimited working life.

The two-part epoxy, although used successfully for the past

several years, requires the addition of a chemical activator which must be weighed and mixed. With a maximum working life of several hours, this type is limited to low-volume bonding.

On the other hand, the one-part epoxy, recently developed at Minnesota Mining & Mfg. Co., Detroit, is ideal for high-volume bonding on large and complex parts. The bonds hold at service temperatures from -65°F to $+350^{\circ}\text{F}$.

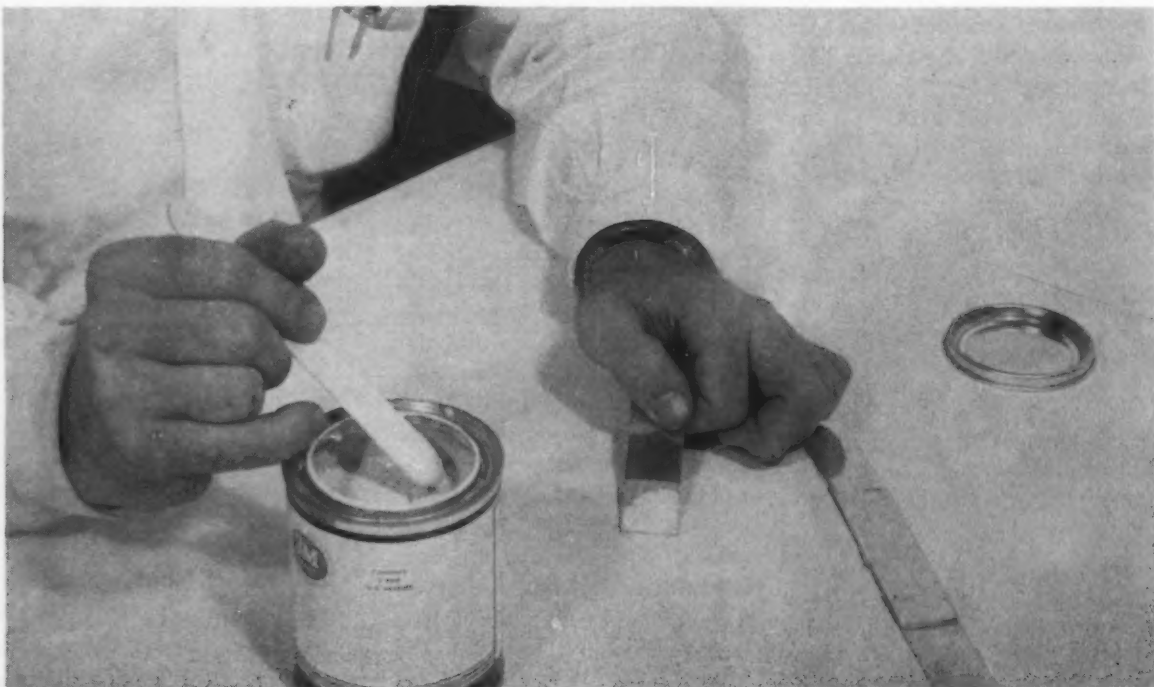
No Mixing — A latent catalyst, added to the formulation during manufacture, eliminates mixing operations. Unlimited working life permits continued use with no

danger of hardening before application is completed.

One-part epoxies generally cure at temperatures ranging from 300°F to 400°F , but like most two-part epoxies, need only contact pressure for producing high-strength bonds. Elaborate jigs and fixtures are not required for high pressure on parts that are complex in nature.

As the cure temperature increases, the time for cure decreases. At 350°F , an hour is required to produce an optimum cure, while at 400°F , an optimum cure may be obtained in 15 to 20 minutes.

Solvent-Free — Like two-part formulations, the one-part epoxy is



USE WITHOUT MIXING: One-part resin bonds directly without adding activator. Solvent-free paste

won't harden until cured. It can be applied by roller, brush or spatula.

100-pct solids. But the flowable paste-type adhesive differs from the two-part type in that it contains no solvent. Thus there's no time interval required for evaporation before the bond is made. Since volatile byproducts are not given off during the curing cycle, it's particularly useful in bonding impervious materials.

The new adhesive can be applied directly from the original container to the surface by roller, brush or spatula. On application, the adhesive jells slightly and maintains its form and position during the curing cycle.

Loosely fit parts can be joined because adhesive thickness can be closely controlled.

Strong bonds are possible on most metals, including aluminum, brass, magnesium, steel, stainless steel, titanium, and copper.

Good for Honeycomb—One-part adhesives, like the two-part types, have excellent honeycomb filleting properties. Fig. 1 shows a bonded honeycomb panel with one facing removed.

Shear strength varies with operating temperatures. Fig. 2 plots the relative strength of both one-part and two-part adhesives. Curves "A" and "B" are two-part epoxies, the first cured at room temperature and the second at 200°F. Curves "C" and "D" are one-part epoxies both cured at 350°F.

Where both one- and two-part types are usually quite brittle and have poor shock resistance, some one-part epoxies, such as EC-1386 and EC-1469, have good flexibility. They provide bonds that have greater bending strength and greater resistance to cracking or shattering under shock or bend loads.

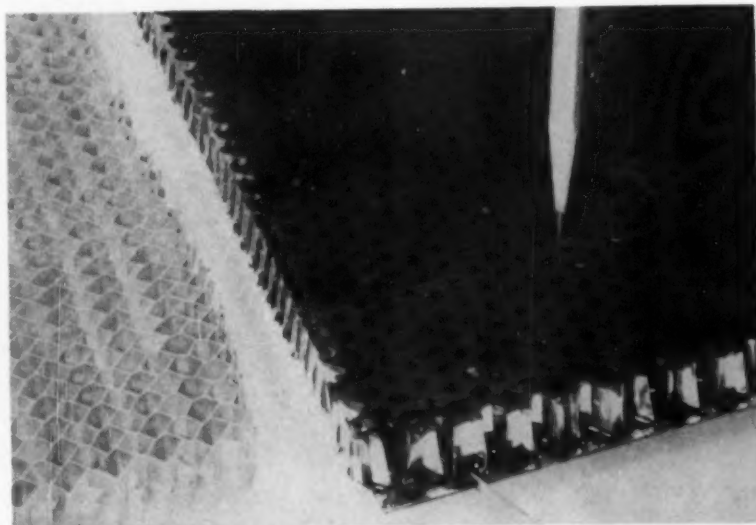


FIG. 1: With one facing removed, honeycomb panel (right) exposes large bonding area with excellent filleting.

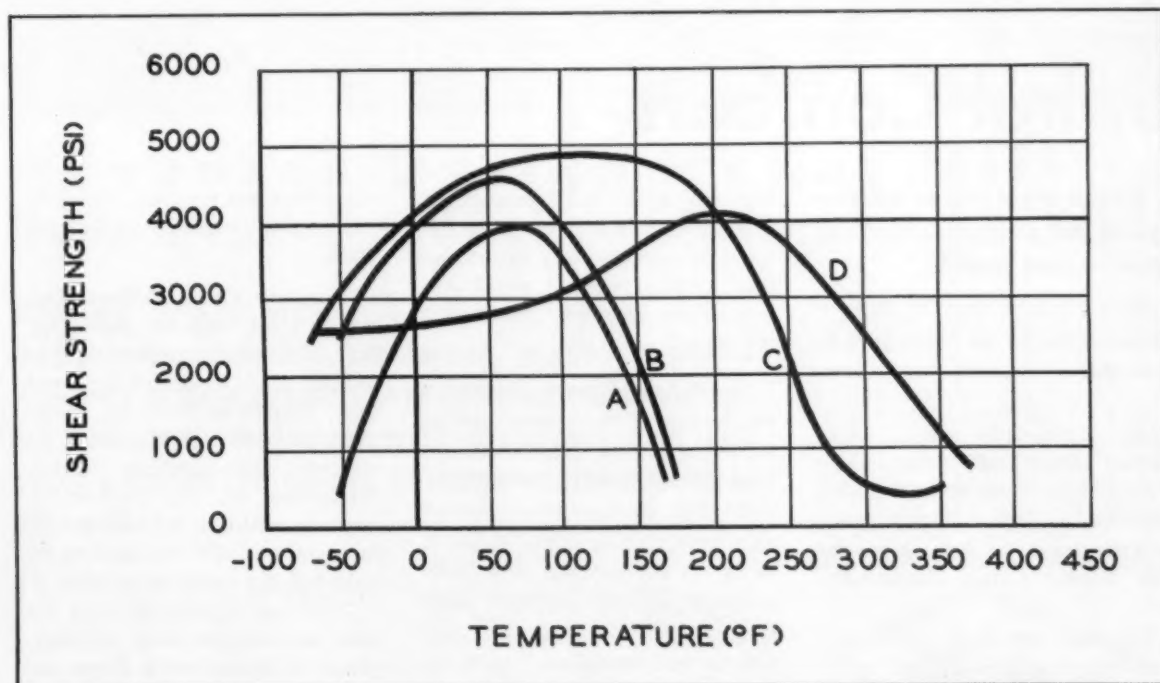
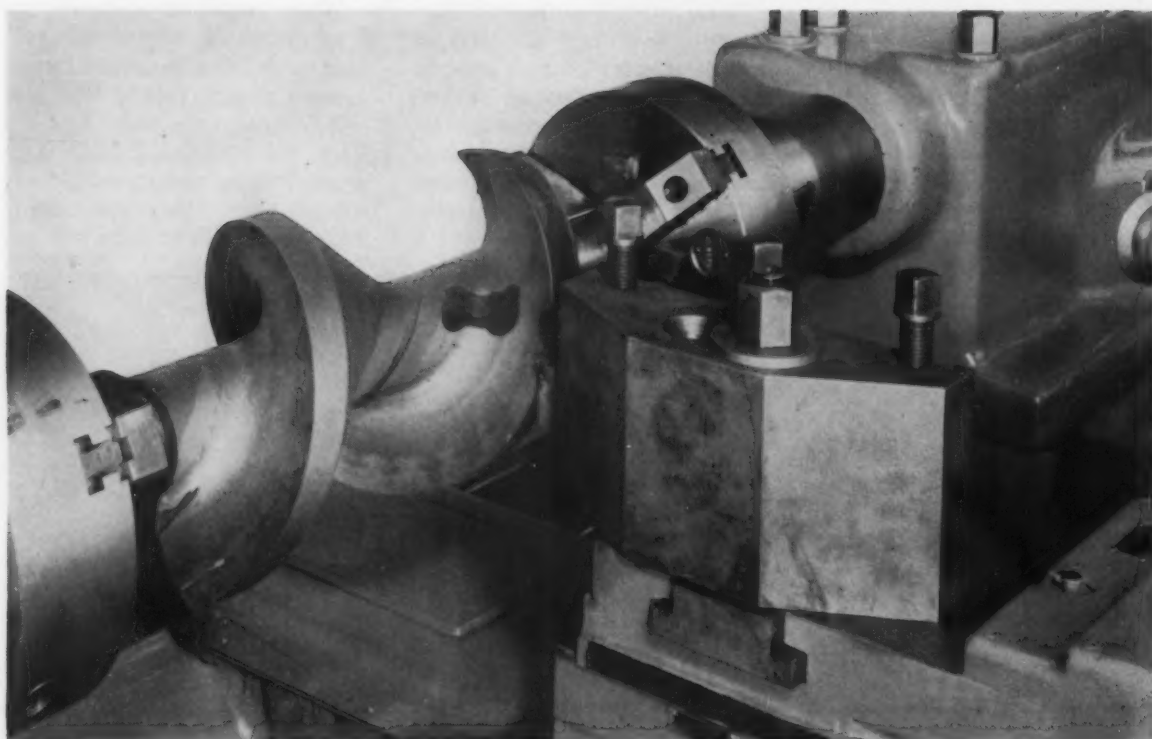


FIG. 2: One-part resins (curves "C" and "D") exhibit greater temperature resistance over a wider tempera-

ture range than two-part resins (curves "A" and "B"). The one-part system cures at 300°-400°F.



MANY MORE: This spiral-type compressor rotor is typical of the contoured parts the new lathe can produce.

Tracer Lathe "Chases" Spiral Contours

Puzzled about how to machine convex and concave surfaces on spiral shaped parts?

Here's a new way of using a tracer lathe to do these jobs in a hurry.

■ An engine lathe with a "non-tracing" tracer unit automatically machines the concave and convex contours of spiral-shaped rotor compressors at the Roots-Connorsville Blower Corp., Connorsville, Ind.

The work is done on a 32-in. engine lathe especially designed by the R. K. LeBlond Machine Tool Co., Cincinnati. The machine's tracer unit does not trace a template con-

tinuously in the usual manner. Instead, it is used to position the tool for each successive cut. The cutting tool literally "chases" spiral contours in the same way that threads are chased.

Broad Lead Range—A continuous leadscrew engagement and an extra-long full nut synchronize carriage movement with spindle revolution. The carriage chases spirals with leads ranging from $4\frac{1}{2}$ in. to 16 in. A conventional cross slide, mounted on the carriage, automatically provides in-and-out motion for tool relief from 0 to $\frac{3}{8}$ in.

Automatic positioning of the cutting tool between cuts is provided by a special length slide and the

tracer unit and template. These accessories are mounted on the cross slide.

Template Carrier Moves—During each cut, only the chasing action takes place; there is no feed motion. Each feeding of the length slide, from 0 to 0.070 in., moves the tracer stylus slightly along the template. This positions the tool for the next cut. The template carrier is mounted on the carriage and moves with it; it is not fixed on the lathe bed in a stationary position.

Three-jaw chucks in both the head and tailstock clamp the workpiece. A special work driver and locating pin keep the workpiece from slipping during the automatic cutting cycle.



Advanced Design McKay Mill Sets Pipe Production Records At J&L

New era in pipe production comes of age as McKay incorporates oil cooled transformer, continuous visual recording of weld pressure and induction seam annealing, automatic control of weld speed and heat and synchronization of cut-off in large resistance weld pipe mill.

RECENTLY Jones & Laughlin Steel Corporation set into operation their new McKay Pipe Mill capable of producing 150 feet of 12 $\frac{3}{4}$ " OD electricweld pipe every minute. More important than the speed, according to J & L officials, is the quality of the product. McKay's forced oil cooled trans-

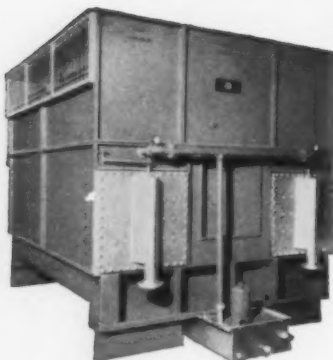
former assures more pipe per kilowatt hour. It is the first 2400V transformer designed for continuous operation at frequencies up to 180 cycles.

Hydraulic load cells measure forging and electrode pressures at the weld zone. Weld speed and heat are controlled with precision to

assure the most uniform welds possible at any speed with no readjustment necessary. Continuous seam annealing assures uniform ductility of pipe, and for the first time a synchronized cut-off has been successfully adapted to a large mill. The mill has several other advanced innovations applied to a line this size for the first time. To get all the facts talk with a McKay engineer soon.



**THE MCKAY MACHINE COMPANY
YOUNGSTOWN, OHIO**



Is your plant CRITICALLY SHORT of WATER?

You will make major water savings, reduce your costs, solve your problems of water supply or disposal and get HIGH OPERATIONAL EFFICIENCY with Niagara "Aero" Evaporative Heat Exchangers, After Coolers or Condensers for these important plant services or processes:

- AFTER COOLING and air drying for large air and gas compressors and AIR LIQUEFACTION
- COOLING ENGINES, COMPRESSORS, HYDRAULIC PRESSES
- COOLING QUENCH BATHS, FURNACES, INERT ATMOSPHERES
- COOLING ROLLS, WELDERS, DRAWING OR EXTRUSION DIES
- PRODUCT AND PROCESS COOLING CHEMICALS OR INTERMEDIATES
- COOLING LIQUIDS OR GASES IN CLOSED SYSTEMS
- VAPOR CONDENSING UNDER VACUUM
- ELECTRONIC PROCESS COOLING

High operational efficiency means: precise temperature for improved product and process quality control, heat removal at rate of input, simple operating conditions, real economy in upkeep, sustained full capacity.

Also it means cooling in a closed system with your product kept free from contamination or, when condensing, getting a pure condensate holding high quality in your product or material.

Niagara machines do the work of a cooling tower plus shell-and-tube coolers with a single machine that saves piping, water handling disposal and treatment expense and 95% of water consumed by contact cooling methods.

Write for Bulletin 129, 130, 132, 136R.

NIAGARA BLOWER COMPANY

Over 35 years of Service in Industrial Air Engineering

Dept. IA-2, 403 Lexington Avenue
NEW YORK 17, N. Y.

District Engineers
In Principal Cities of U. S. and Canada

FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 121.

Tape Controls

Tape-controlled drilling, tapping and boring machines are illustrated in a bulletin. It explains how tape controls work, how to mark up a blueprint, program a part, punch the tape and set-up work. Case histories appear, too. (Burg Tool Mfg. Co., Inc.)

For free copy circle No. 1 on postcard, p. 121

Photodrawings

Photodrawings can help design and layout men considerably, points out the publisher of a new booklet. In a dozen pages, the booklet describes a technique of using photographs to convey engineering data in easy-to-visualize form. (Eastman Kodak Co.)

For free copy circle No. 2 on postcard, p. 121

Flights, Feedscrews

Flights and feedscrews and their fabrication are described in a bulletin. It tells how sectional flights are made, cut, shaped, shaft-mounted, and welded. (James Eagen & Sons.)

For free copy circle No. 3 on postcard, p. 121

Precision Casting

A 16-page booklet introduces a new facility for mass producing ferrous and nonferrous castings. It

gives a capsule review of the new plant's extensive engineering, production, testing and inspection departments. (National Precision Casting Corp., subsidiary of The Beryllium Corp.)

For free copy circle No. 4 on postcard, p. 121

Variable Drives

Variable speed drives and their applications are described in an 8-page brochure. (Sterling Electric Motors, Inc.)

For free copy circle No. 5 on postcard, p. 121

Adhesives, Coatings

Adhesives, sealants, paints and coatings available from one company are listed in a catalog according to government specifications. It gives the firm's own product numbers and corresponding Federal specifications numbers. (Magic Chemical Co.)

For free copy circle No. 6 on postcard, p. 121

Saw Chains

Loaded with tips on saw chain trouble shooting, a 20-page manual tells how to keep saw, chain, bars and sprockets in top working condition. It covers: (1) preventive maintenance; (2) chain damage causes; (3) do's and don't's of saw chain filing. (Atkins Saw Div., Borg-Warner Corp.)

For free copy circle No. 7 on postcard, p. 121

Metals Research

Metallurgical research and development services conducted by a skilled technical group are analyzed in a bulletin. It specializes in stud-

ies of metals, cermets and ceramics for both nuclear and specialized purposes. Consulting services are described as well as customized help for manufacturers setting up their own facilities for fabrication of nuclear components. (Metals Research & Development, Inc.)

For free copy circle No. 8 on postcard, p. 121

Barrel Finishing

If you can make use of barrel finishing units now available, you can slash your production costs by 80 pct or even more. That's what a company's 4-page folder says. Reading it will help tell if you qualify to start slashing. (Speed-D-Burr Corp.)

For free copy circle No. 9 on postcard, p. 121

Punch Press

Literature now available supplies facts on a new 8-ton punch press. Top features of this machine emphasize safety. Unique devices prevent operators from getting into accidents, even if they are willing to take a chance. (Kenco Mfg. Co.)

For free copy circle No. 10 on postcard, p. 121

Lock Fasteners

Lock fasteners featured in a 4-page folder boast three big advantages: (1) Consistently controlled preload; (2) Minimum size and weight; (3) Simplicity of installation. (Hi-Shear Rivet Tool Co.)

For free copy circle No. 11 on postcard, p. 121

Stud Welding

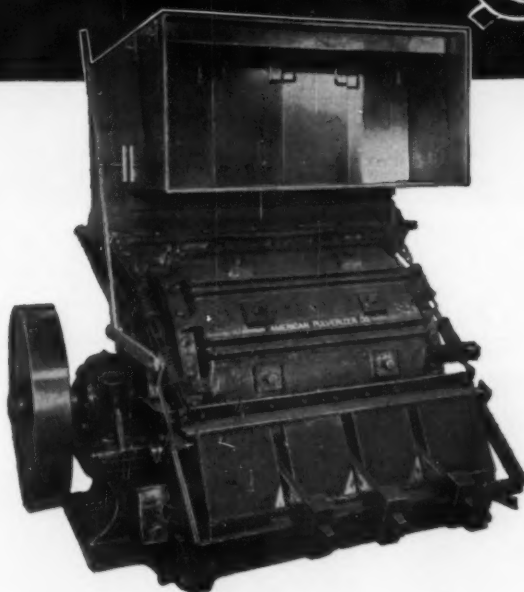
A 4-page bulletin describes a stud welding innovation for cutting manufacturing and construction costs. It's a new pistol-sized, lightweight, fast-working stud welding gun. (Nelson Stud Welding Div., Gregory Industries, Inc.)

For free copy circle No. 12 on postcard, p. 121

Conveyor Chain

Engineered conveyor chain is the subject of a data sheet. In addition to containing dimensional prints of various sizes of chain, it includes illustrations of actual uses in slat conveyors, pusher bar boosters and

Here's A Curly Cue To New Market Value For Your Machine Turnings



American METAL TURNINGS Crusher

That single machine turning of curled-up steel shown above can be mighty troublesome and costly to your operations.

Gnarled up with thousands of others like itself, it becomes a problem in space . . . gallons of re-usable cutting oil are trapped in the folds . . . and the scrap value is greatly minimized.

Answer? Run this tangled waste through an efficient, AMERICAN METAL TURNINGS CRUSHER. Out come sized chips that are easy to handle for shoveling or pneumatic handling . . . easy to store (savings in space up to 75%) . . . easy to spin for oil recovery . . . and crushed turnings command a higher price.

The cost is easy, too, on your scrap recovery program. Pays for itself.



RECLAIM FUSED WELDING FLUX

American Hammermill reduces fused flux to fine regranulation for perfect re-use. Why throw away profits! Details on request.

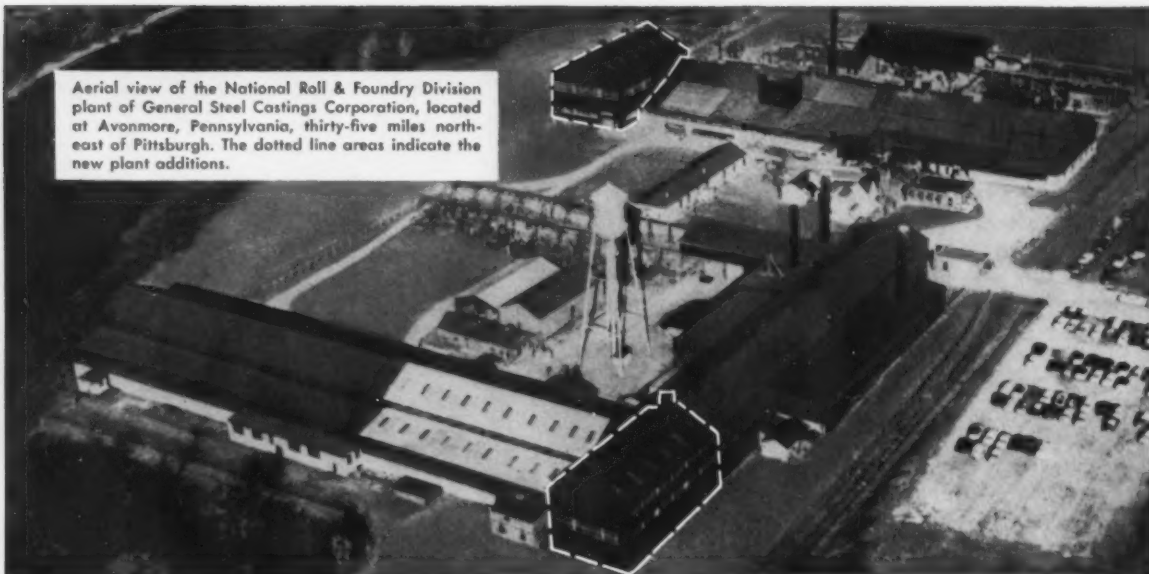


"Write for Metal Turnings Bulletin"

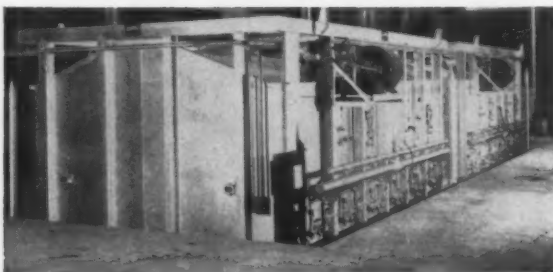
1439 MACKLIND AVE.

SAINT LOUIS 10, MISSOURI

Aerial view of the National Roll & Foundry Division plant of General Steel Castings Corporation, located at Avonmore, Pennsylvania, thirty-five miles northeast of Pittsburgh. The dotted line areas indicate the new plant additions.



GENERAL STEEL CASTINGS EXPANDS NATIONAL ROLL & FOUNDRY FACILITIES



New annealing furnaces installed in the addition to the iron foundry. These furnaces are used in the heat treatment of alloy iron rolls.



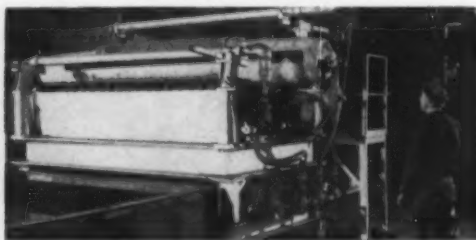
A 60-inch precision-finish grinder, recently installed at National, is the "last word" in grinding equipment. This 60" grinder is one of the largest sizes manufactured for the roll industry.

To keep pace with the ever-growing steel industry, the National Roll Division's plant and equipment have been undergoing an expansion and modernization program that is nearing completion.

The photographs show four of these additions. There are many others: new pouring pits, furnaces, lathes and testing equipment, etc.

With these new facilities and National's almost half-a-century experience, we are prepared to furnish you the best in iron and steel rolls in a wide range of sizes and shapes for the most exacting rolling mill uses.

Specify National—you'll find they consistently live up to their reputation for long tonnage life, and quality of product.



Quenching machine designed and built by the National Roll & Foundry staff is used for rate control quenching of steel back-up rolls and steel work rolls.



GENERAL STEEL CASTINGS CORPORATION

NATIONAL ROLL & FOUNDRY DIVISION

Avonmore (Westmoreland County) Pennsylvania

General Steel Castings Corporation: General Offices, Granite City, Ill. • Plants: Granite City, Ill.—Eddystone, Pa.—Avonmore, Pa.

FREE LITERATURE

side chains of open type belting in metal cleaning and processing machines. (The Alvey-Ferguson Co.)
For free copy circle No. 13 on postcard, p. 121

Steam Cleaner

Fireless steam cleaning units are detailed in a 2-page bulletin. It tells how the cleaner uses live steam from an existing steam supply. (Kelite Corp.)

For free copy circle No. 14 on postcard, p. 121

Industrial Floors

Corrosion-resistant floors for industrial installation are discussed in a bulletin. It tells of floors that are engineered to meet industrial customers' requirements. Types of construction and an estimating table also are included. (Atlas Mineral Products Co.)

For free copy circle No. 15 on postcard, p. 121

Materials Handling

Cost-cutting hints on materials handling are offered in a folder. It includes specific solutions to problems involving different type loads in various industries. (Towmotor Corp.)

For free copy circle No. 16 on postcard, p. 121

Conveyor Components

A data sheet illustrates a new, simplified design of conveyor chain possessing very high tensile strength. Strong and long wearing, the conveyor chain comes in 3¼, 4, 4½, 6 and 7½ in. (Browning Mfg. Co.)

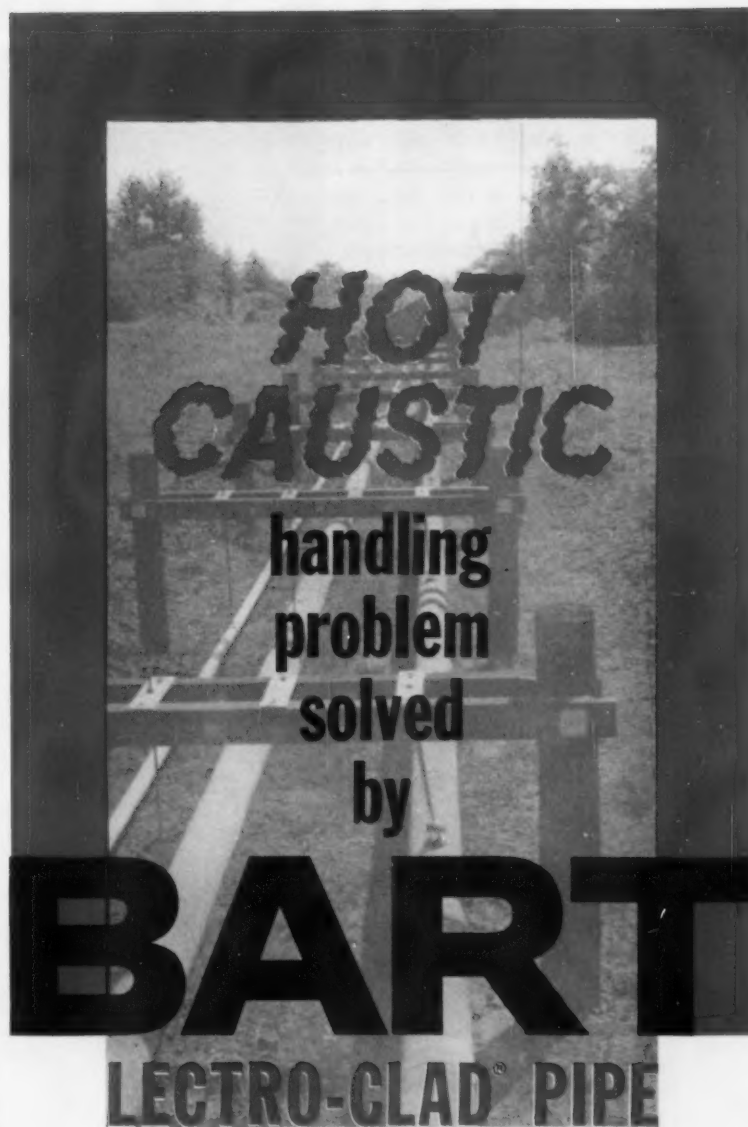
For free copy circle No. 17 on postcard, p. 121

Steel Plates

High-strength steel plates are described in a 4-page folder. It says the plates are lightweight, yet stronger than carbon steel of the same thickness. In addition, it points out that they have excellent welding and corrosion-resistance properties. (Colorado Fuel & Iron Corp.)

For free copy circle No. 18 on postcard, p. 121

THE IRON AGE, February 27, 1958



**HOT
CAUSTIC**

handling
problem
solved
by

BART

LECTRO-CLAD PIPE

At the Muscle Shoals chlorine-caustic soda plant of Diamond Alkali, one of the largest plants of its kind, BART LECTRO-CLAD pipe carries hot caustics to storage tank—efficiently and economically.

IF YOU HANDLE CORROSIVES OF ANY KIND —

Investigate BART LECTRO-CLAD pipe and fittings. Providing a smooth, ductile, pore-free coating of nickel in its purest form, they combine high strength, heat tolerance, and remarkable ease of fabrication and maintenance. Most sizes readily available, others to order. Write distributor for full technical data. Michigan Pipe Co., 2415 Burdette Ave., Ferndale, Michigan.

BART MANUFACTURING CORPORATION

Electroforming • Pipe Lining & Coating • Platers • Chemical Pumps • Engineering Design Services

227 Main Street, Dept. 1, Belleville 9, N. J.



SCHLOEMANN

Five-Tube Tester

- ① Singly movable heads
- ② Jointly movable heads
- ③ Movable carriage
- ④ Charger and discharger
- ⑤ Prefill-water station
- ⑥ Pressure water station
- ⑦ Control desk



Photo: Courtesy of Jones & Laughlin Steel Corp.

Up to 1,200 tubes per hour • In operation in the U.S.A.

Tubes of varying lengths and diameters can be tested automatically on SCHLOEMANN's new five-tube tester. Two standard models are available — one for tubes 1/2 in. to 2 in. i. d., 17 ft. to 25 ft. long and another for tubes up to 4 in. i. d. and 50 ft. in length. Special design permits rapid change-over to different tube sizes. Maximum testing pressure 1,500 PSI (25 ft. model), 2,300 PSI (50 ft. model). — Electro-hydraulic pre-set controls. For further details send for leaflet 3111e.

FELLER ENGINEERING COMPANY 1190 Empire Building, Pittsburgh 22, Pa.

Schloemann Tube Testers for the U.S.A. and Canada are manufactured by the Aetna-Standard Engineering Company.

HOT AND COLD ROLLING MILLS • COUNTERBLOW HAMMERS • HYDRAULIC PRESSES

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Industrial Cars

Industrial cars for product and materials handling are well illustrated in an 8-page booklet. These cars, custom built, haul just about anything, any size, any weight. (Easton Car & Construction Co.)

For free copy circle No. 20 on postcard

Conveying System

A practical do-it-yourself installation workbook is now available to users of power belt and gravity conveyors. This step-by-step 20-page guide in the selection, installation and operation of conveyors is jammed with information. (A. B. Farquhar Div., The Oliver Corp.)

For free copy circle No. 21 on postcard

Loaders, Unloaders

Loaders and unloaders for handling work trays in and out of, and between, automatic heat treating units or related equipment is the subject of a bulletin. (Ipsen Industries, Inc.)

For free copy circle No. 22 on postcard

High-Speed Presses

High-speed precision presses are shown in a folder. It describes "C" type units from 15 to 75 ton and straight side ones from 75 to 200 ton. (Precision Welder & Flexopress Corp.)

For free copy circle No. 23 on postcard

Steel Tubing

Simplified instructions for figuring weights of square and rectangular steel tubing are featured in a 12-page booklet. A standard factor for converting round steel tubing

weights to square or rectangular tubing is given. It includes tables covering sizes from 1/16-in. OD with an 0.004-in wall thickness to 10 3/4-in. OD with a 1 5/8-in. wall thickness. Data applies either to welded or seamless steel tubing. (Rome Mfg. Co., div. of Revere Copper & Brass, Inc.)

For free copy circle No. 24 on postcard

Shears

Modern ring and circle, circle, and slitting shears, both hand and power models, are featured in a bulletin. Features for three lines are clearly described, including all-welded steel beds, box type construction cutting head, parallel and inclined construction of cutter spindles, and adjustable swing and slitting gages. (Niagara Machine & Tool Works).

For free copy circle No. 25 on postcard

Microhoning

A 32-page service and equipment catalog contains a brief explanation of microhoning. And it outlines capacities and specifications of a representative range of equipment—including machines, tools, fixtures, abrasives, coolants—for cylindrical, spherical and flat applications. (Micromatic Hone Corp.)

For free copy circle No. 26 on postcard

Gloves

Gloves in five types of molded rubber and synthetic materials in various weights, sizes, and types are introduced in an 8-page bulletin. A selection guide shows relative resistance of the different materials to nearly 200 common chemicals. (Mine Safety Appliances Co.)

For free copy circle No. 27 on postcard

Welding

Supplies and accessories for gas and arc welding are catalogued in a 48-page publication. Presented are: ferrous and non-ferrous welding rods for oxyacetylene welding and heliwelding; welding and brazing fluxes; aluminum welding fluxes;

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 2/27/58

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31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
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FREE LITERATURE

silver brazing alloys; brazing alloys; protective equipment; electrode holders and cable connectors; weld cleaning tools; twin and single line hoses; and many other items. (Air Reduction Sales Co.)

For free copy circle No. 28 on postcard

Pumps

Centrifugal pumps designed for continuous heavy-duty operation within the medium pressure range are featured in a flier. It gives cross-sectional views and a table of pump dimensions. Pumps are for general hydraulic service. (Ingersoll-Rand.)

For free copy circle No. 29 on postcard

Radial Drill

A new radial drill for drilling, boring, and tapping comes in 4-ft, 4½-ft, and 5-ft models. It has a self-contained motor driven chrome hardened and ground geared drill head unit with a single lever giving eight direct reading spindle speeds. A bulletin describes it. (Morey Machinery Co., Inc.)

For free copy circle No. 30 on postcard

Safety Apparel

Covering everything from seamless finger guards to rubber boots, a new catalog describes almost every type of safety apparel. (Advance Glove Mfg. Co.)

For free copy circle No. 31 on postcard

Rotary Compressor

Rotary air compressors are introduced in an 8-page brochure. These 1 to 2 hp pumps supply air in the 150 to 175 psi range. (American Brake Shoe Co.)

For free copy circle No. 32 on postcard

Tool Services

Complete tool services available from one company are detailed in a 6-page folder. It explains how you can get immediate delivery on a large stock of standard cutting tools and fast service on tools made to

your requirements. Also available are engineering and tool grinding services. (Rutland Tool Service.)

For free copy circle No. 33 on postcard

Packaging

Packaging cost reduction is the subject of a booklet. It covers the field from original package design to final product shipment. The 24-page publication offers information on packing, sealing, warehousing and shipment of corrugated boxes. (Hinde & Dauch.)

For free copy circle No. 34 on postcard

Industrial Gloves

Industrial gloves can be selected properly with ease, using new catalog sheets. These help you pick the right glove for use with more than 100 oils, acids, caustics and solvents. (Pioneer Rubber Co.)

For free copy circle No. 35 on postcard

Toolholders

How to cut machining costs by using one maker's toolholders and inserts is outlined in a 56-page manual. Completely indexed, the manual covers selection of tools to fit specific metal-cutting jobs. (For free copy write on company letterhead to Vascoloy-Ramet Corp., Waukegan, Ill.)

Aprons, Gloves

PVC-impregnated industrial clothing covered by three new bulletins is lightweight, flexible and resistant to chemicals, oils, and abrasion. Clothing includes garments, gloves and aprons. (Jomac, Inc.)

For free copy circle No. 36 on postcard

Transformers

Some of the research facilities for one producer's wide line of transformers are described in a bulletin. Covered are: power, unit substation, secondary network, industrial application, furnace, distribution, and instrument transformers. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 37 on postcard

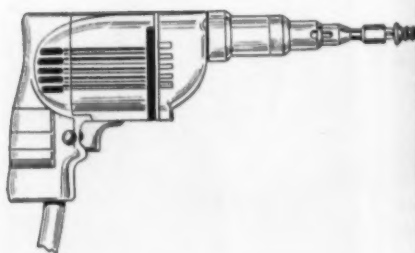
Continental sets quality standards to make high-speed driving pay off its full potential in savings

Are you "collecting" the savings you rightfully expect from the use of automatic screw driving machines and other power driving equipment? Most of the potential savings can be wasted when fastener faults cause frequent downtime on the assembly line.

That is why Continental quality-control standards are matched to the most exacting demands of high-speed driving equipment. Special tests and trial runs are used to spot any defects that

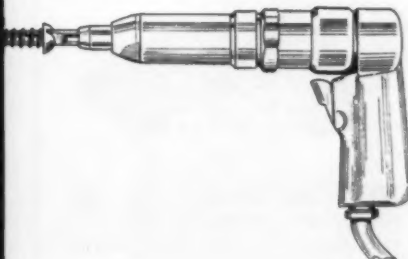
might pass undetected in ordinary inspection. No screws that fail to meet Continental's close tolerances get by. You get dependable uniformity in every detail, and avoid slow-downs.

Next time you order fasteners, specify Continental HOLTITE. You'll see why Continental users "collect"—day after day—the *full savings* planned in assembly. For prompt service, write or phone: Continental Screw Co., 450 Mt. Pleasant St., New Bedford, Mass.



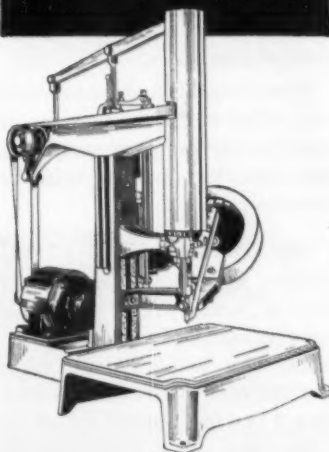
Here's where you
win or lose on
fastener costs.

Keep assemblies
trouble-free.



Test runs duplicate assembly line conditions

Automatic screw driving machines of the types in current use are set up in the Continental quality-control laboratory as required for test runs under job conditions. With these and many other tests, Continental assures you of fastener quality and uniformity matched to the toughest high-speed driving demands.



Are you missing savings you could be making?

Find out how Continental specialized cost-saving experience can help you. At your request, a Continental Assembly Specialist will survey your operations, and make detailed recommendations for maximum cost reduction. This advice is unbiased, since HOLTITE Fasteners include all types of threaded fasteners.



MEMBER
SCREW RESEARCH
ASSOCIATION

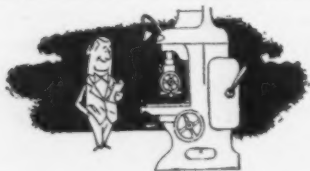
CONTINENTAL HOLTITE FASTENERS

HOLTITE PHILLIPS AND SLOTTED HEAD
WOOD • MACHINE • TAPPING • THREAD-FORMING • SEMS • NYLOK
HY-PRO PHILLIPS INSERT BITS AND HOLDERS



ATTEND THE
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ASTE
TOOL SHOW
CONVENTION CENTER
PHILADELPHIA MAY 1-8

SEE all the very latest advances and improvements in more than thirty major categories of industrial products.



ATTEND top-level conferences, conducted by recognized authorities on the newest production techniques and developments.



MEET and exchange ideas with management, engineering, production, sales people from the nation's leading industrial concerns.



INSPECT the modern equipment and up-to-the minute manufacturing methods being utilized in booming Delaware Valley plants.



TECHNICAL BRIEFS

Careful Setup Design Improves Finishes

Individual designing of its finishing operations affords an office furniture maker an even finish on its products.

By carefully planning each step, there's no overexposure to any one process; nor is there underexposure.

■ Handling up to 50,000 lbs daily, a semiautomatic finishing system helps speed work output for a steel office furniture maker. It transports and finishes pieces ranging from a 15 x 28½ x 30-in. two-drawer file cabinet to a 18 x 28½ x 57½-in. five-drawer cabinet.

Recently installed in the new 37,000 sq ft plant of Art Steel Co., Inc., Los Angeles, the system aims to get high production with as few operating personnel as possible. At the same time, it occupies a minimum of floor space.

Spread over 1/6 of the total plant area (6000 sq ft), the finishing unit requires only four paint sprayers and three operators working under two supervisors.

Use Overhead Hooks — After cleaning to remove shop dirt and greases, workers load component parts on hooks of an overhead conveyor. This travels 500 ft, moving at a rate of 8 to 10 fpm. Hooks are spaced two feet apart.

The first process consists of a 3-stage, 5-minute washing cycle in tanks in a section, 46 x 11 x 7 ft, where parts are immersed in Oakite, at 180°, plain water, and chromic acid at 180°.

Oven Dries Parts—Next is a dry-off process in a 6 x 11 x 26-ft oven.

Here the production parts bake about three minutes at 400°F. Components then move on to opposed-type spray booths where two sides are sprayed at once. Each side location utilizes an air-replacement system and water curtain.

Final finishing is a bake-oven treatment. Making two passes through the 50 x 10 x 11-in. con-



In this booth, finishers spray parts on both sides.

vection type gas oven at 350°F, the components bake for 15 minutes. They are then unloaded from the conveyor and reassembled. The finishing process takes just under one

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 121. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

hour on the average to complete.

Keep Coats Even—Housings for each of the various stages were designed individually to assure even finishing with neither over nor under exposure to any one process. If, for example, too short a time were devoted to the washing processes, production units would emerge without a sufficient phosphate coating, making them prone to corrosive attacks. Too much time would cause blemishes on the paint finish. Timing in the finished bake oven is also critical, to prevent tacky or brittle finishes.

Designed and manufactured by Despatch Oven Co., Minneapolis, the finishing system is one of three for use in the office furniture maker's widely located plants.

Research Throws Light On Welding Process

Welding at relay contacts takes place at the instant the arc extinguishes, according to research studies carried out at Bell Telephone Laboratories, New York. What's more, the studies throw new light on the welding process in general.

Prior to this research, many welding engineers believed that since volume of molten metal increases with time, welding occurs only after dissipation of a critical amount of energy and hence for a critical volume of melt. But the new findings now indicate that welding occurs both for much greater and much smaller energies. Welding time thus bears no direct relationship to power dissipated in the arc, but it is very well correlated with the time of extinction of the arc.

Tests Relay Contacts—The welding process was studied at Bell Laboratories by short-circuiting various short lengths of charged transmission line through an arc formed by closure of a pair of clean relay contacts. Researchers found that the contacts tend to weld at the time when the line has just been completely discharged.

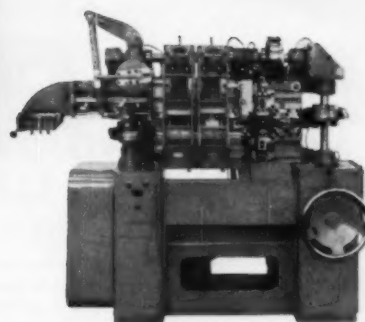
Since the arc is known to produce

THE FIRST

ENTIRELY NEW

FOUR-SLIDE IN

FIFTY YEARS!



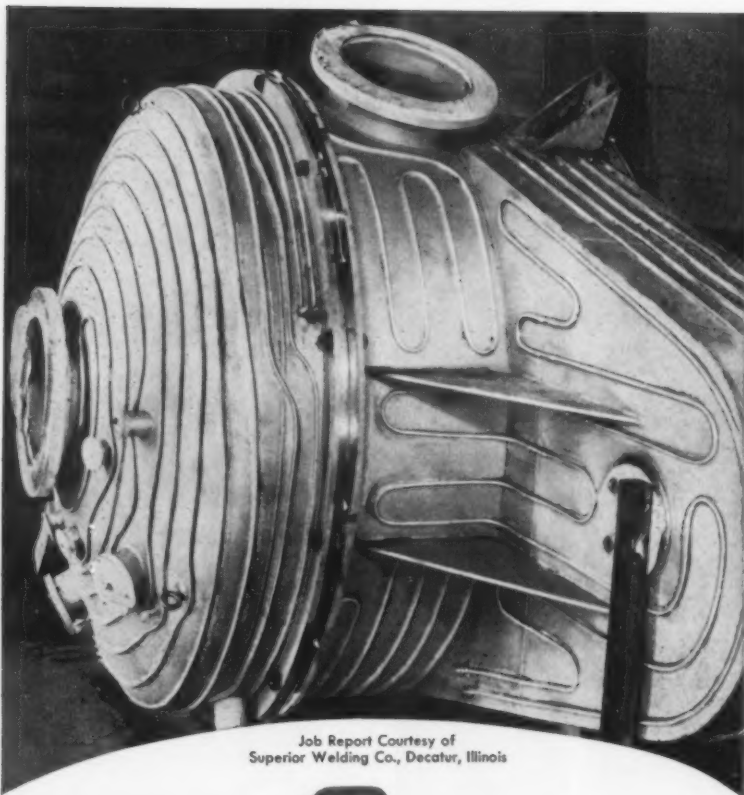
A development of industry-wide importance is the Torrington Verti-Slide—a new vertical 4-slide that is the first major innovation in the basic field of wire and strip forming equipment in half a century!

The Verti-Slide was designed to meet a serious need for greater versatility, lower tooling cost, faster set-up time and reduced floor space. We urge you to investigate the new Torrington Verti-Slide in detail.

THE TORRINGTON MANUFACTURING COMPANY

TORRINGTON, CONNECTICUT • VAN NUYS, CALIFORNIA • OAKVILLE, ONTARIO

When stainless welds must be VACUUM TIGHT



Job Report Courtesy of
Superior Welding Co., Decatur, Illinois

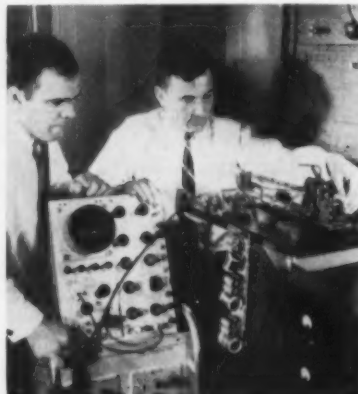
WELD WITH **ARCOS** STAINLESS ELECTRODES

Shown here is a stainless steel furnace body of type 304 ELC for use under very high vacuum conditions in the casting of metals where exceptional purity is required. Arcos Chromend K-LC Stainless Electrodes were used because Arcos electrodes not only assured the proper weld metal chemistry, but also the necessary soundness to insure vacuum tight welds. Save money and future problems with long-lasting Arcos-produced welds. ARCOS CORPORATION, 1500 S. 50th Street, Philadelphia 43, Pa.



TECHNICAL BRIEFS

a small pool of molten metal on the contact surface, this suggests that molten metal is drawn across the contact gap by the redistributed field



With an oscilloscope, researchers study relay-contact welds.

after the arc is extinguished, resulting in a weld.

For longer transmission lines or more complex circuitry, welding is most probable at the instant the arc is terminated. In such cases, however, extinguishment is due to a fundamental instability in the arc itself.

Screening Is Vital To Product Plans

The art of "picking a winner" from hundreds of ideas can cut down the new-product fatality rate to a minimum. That's the word from S. C. Johnson, who is in charge of new-product development at S. C. Johnson & Son, Inc., Racine, Wis., a wax manufacturing firm. Addressing a forum of the American Marketing Assn., recently, Johnson said that "effective screening" has upgraded the quality of ideas actually being worked on in his firm's laboratory, "so that now our fatality rate of approved ideas is only one in ten during development, and we have had no fatalities after the product reached the last marketing phase."

"The most important thing to

look at first in screening is the ratio of investment to profit," Johnson emphasized. "Our objectives are to pick product ideas with the lowest risk and highest possible return."

Makes Squaring Shears From Ductile Iron

Squaring shears of ductile iron are now being produced by Wysong & Miles Co., Greensboro, N. C. At the machine fabricator's foundry, ductile iron is now replacing other metals in many instances. The company finds that nodular iron offers excellent shock resistance, ductility, high tensile and yield strength, and high modulus of elasticity.

Company spokesmen point out that as far as squaring shears are concerned, ductile iron's use results in a more rugged machine for adverse working conditions. It reduces deflection, practically eliminates vibration and assures good alignment. In shearing $\frac{3}{8}$ -in. steel plate, the machine offers such smooth performance that a coin continued to balance on its side during a demonstration operation.

Boats Are Stainless

Inland waterway towboats are now being fabricated of stainless steel. Built by St. Louis Shipbuilding & Steel Co., they are now in service for U. S. Steel Corp.'s

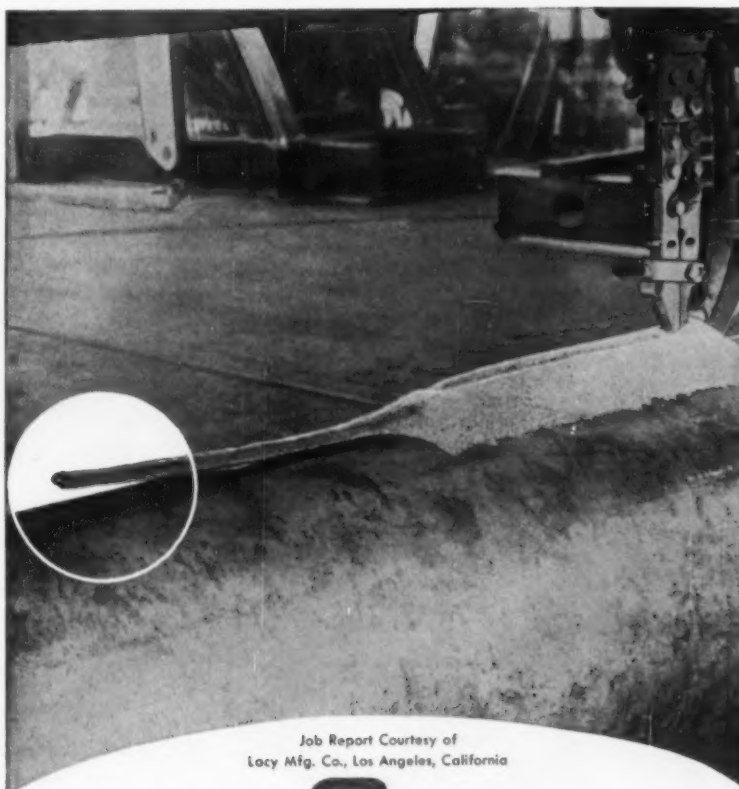


Welder puts finishing touches on boat's stainless hull.

Clairton Works, Pittsburgh. Stainless steel is used for all parts exposed to the water from the main

THE IRON AGE, February 27, 1958

Now, submerged arc stainless welds with slag that "pops-off"



Job Report Courtesy of
Lacy Mfg. Co., Los Angeles, California

WELD WITH

ARCOS

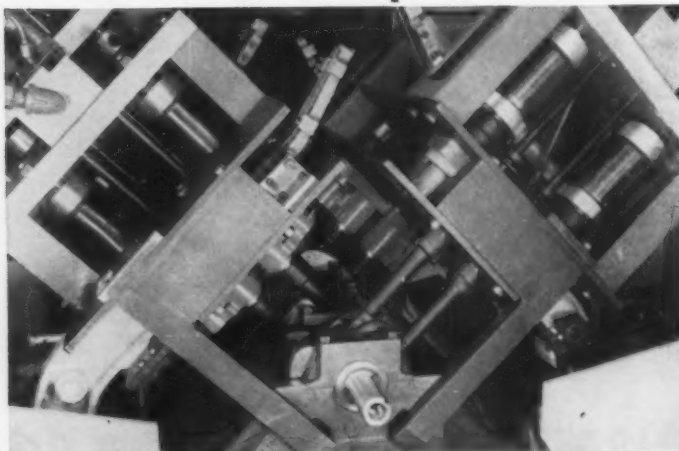


Stainless Wire and Arcosite Flux

Arcos research and experience with stainless weld metal now pays you another dividend—for the first time... consistently self removing slag! On the job above, submerged arc welding of a section of pipe for petroleum equipment, two passes were made with $\frac{1}{8}$ " coiled CHROMENAR KMo Stainless Wire and ARCOSITE S-4 Flux. As the photo shows, the cooling slag is lifting free by itself... leaving a clean, smooth bead. Think what this can mean to you on your own submerged arc welding jobs... saving time and money... better welds than ever before. ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.



automatic assembly machine feeds and tightens nuts to prescribed torque at the rate of 2240 nuts per hour



Here is the working head of the machine capable of feeding and tightening 2240 connecting rod nuts per hour!

The heart of this machine is the Ingersoll-Rand air-powered nut runner with fool-proof Ingersoll-Rand "run-to-stall" torque control.

Ingersoll-Rand has pioneered in the field of assembly machines for running nuts and screws. There is almost no limit to the bolt or screw pattern for which a machine can be developed. Savings in time and costs result in unusually fast pay-out.

If your assembly involves repetitive fastening with bolts, nuts, or screws, it will pay you to consult your Ingersoll-Rand AIRengineer. Chances are he can make recommendations that will materially cut your costs. Ingersoll-Rand, 11 Broadway, New York 4, N.Y.



Ingersoll-Rand

Tools plus AIRengineering
increase output per man

TECHNICAL BRIEFS

deck down, including shafting, struts and rudders.

One twoboat recently put into use on the Ohio and Monongahela rivers is a 600-hp craft using 18 tons of $\frac{3}{8}$, $\frac{5}{16}$ and $\frac{1}{4}$ -in. stainless plate. Two larger vessels use about 40 tons of plate and some 8 tons of stainless steel forgings.

Joining was done via welding. The shipbuilder employs 21 Vickers controlled-arc direct current welders which were used in fabricating the boats.

Steel Jacket Protects Plastic Piping

A new type piping combines steel strength with chemical resistance of plastic.

Now being produced by Jones & Laughlin Steel Corp., Pittsburgh, this product consists of a rigid polyvinyl chloride (PVC) tube which is jacketed with an electric resistance welded steel pipe.

Polyvinyl chloride plastic was



Cut-away section shows PVC tube inside welded steel pipe.

chosen as the liner material because of its widely recognized resistance to a broad range of corrosive fluids. By using a steel jacket, the limitation of pressure common to most plastic pipe is overcome and working pressures of 1000 psi at 150°F are easily attained.

The new pipe will be available in 20-ft mill lengths in the 2, 3, and

4-in. nominal OD sizes. Currently, only the 2-in. nominal (2 $\frac{3}{8}$ -in. OD) size is being offered.

Borer Aids Atom Work

A new type precision jig borer uses a built-in gaging device which solves a complex machining and gaging problem in connection with the production of nuclear reactors. Capable of performing drilling, boring and milling operations to an accuracy of 0.0001-in., models of this type borer are now in use by several prominent manufacturers of nuclear reactors.

While details of specific functions of the machine are not being revealed, its maker, Pratt & Whitney Co., Inc., West Hartford 1, Conn., says that the gaging unit which can accommodate several different types of gages had been constructed as an integral part of the machine. It further points out that the unit in actual production is used as a probing device to accurately position the cutting operation.

The reactor component which the jig borer machines is a massive metal part into which slots more than 5 ft deep have been worked. The built-in gage determines the locations of the full-length "free paths" within these slots relative to a fixed reference point on the work surface. Then certain milling and boring operations on the work surface are performed in specific relationship to the "free paths" as determined by the gaging device.

Casts Big Part

A 4000-lb casting of a giant turntable for airplane testing purposes is the largest ever fashioned from Tenzaloy metal, a self-aging alloy of American Smelting and Refining Co. Cast by Modern Pattern and Foundry Co., Los Angeles, the 8 $\frac{1}{2}$ -ft diam turntable was designed by Andersen Engineering Co., to meet the need for larger



This 4000-lb testing table is cast of a self-aging alloy.

turntables to hold heavy planes while the instruments are calibrated in on-the-ground tests. This increase in the need for bigger castings raised the cost of heat treating previously used metals to a point where it represented a substantial part of the total cost. Tenzaloy is a self-aging alloy. It requires no heat-treatment. The user feels that it offers considerable savings in costs at no sacrifice of desirable properties.

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by *Lansing*

at your Service for...

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ESTABLISHED 1866
**THE WHELAND
COMPANY**

CHATTANOOGA 2, TENN.

New Production Ideas

Equipment, Methods and Services



Automatic Feeding Ups Drop Hammer Efficiency

Electrically controlled, this gravity drop hammer can hook up to automatic feeding devices. Especially designed for precision blow control, it performs such operations as forming, embossing, coining and re-striking in a single die impression. Precise blow control is achieved by maintaining close pressure tolerances on the air supply and by fine adjustment of a regulating valve on the hammer's exhaust air system. Electrical controls permit synchro-

nization of feeding devices and the installation of "no stock, no blow" safety devices to protect the dies. When using the feeds in combination with sorting and orienting equipment, a completely automatic operation can be provided. The forming drop can be arranged for standard treadle operation when it's being manually fed. Air is used only when the hammer is operating. (Chambersburg Engineering Co.)

For more data circle No. 42 on postcard, p. 121

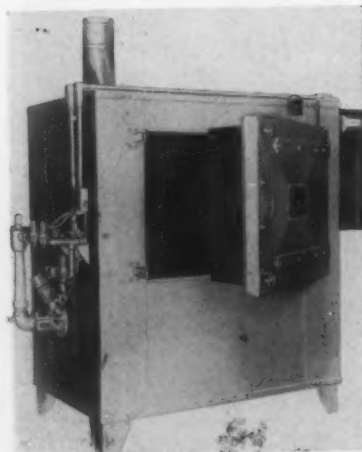


Rockwell Hardness Tester Is Easy To Use

Put this Rockwell hardness tester in the hands of a metallurgist, inspector, mechanic or production worker and you'll get precision readings just about every time. That's how easy to use this tester is, points out its maker. And it delivers durability and sustained accuracy, too. The combination unit is primarily for use by those requiring only limited use of hand-operated Rockwell testers. A combined Rock-

well and Rockwell superficial hardness testing instrument, this setup performs the work of two conventional units in measuring hardness of all type metals. It handles hard or soft materials, polished or unpolished, round, flat, tubular or irregular shapes. (Wilson Mechanical Instrument Div., American Chain & Cable Co.)

For more data circle No. 43 on postcard, p. 121



Heat-treat Furnaces Use Electricity or Gas

Solution heat treating and similar processes can be handled by a new line of 1000°F recirculating furnaces. Equipped with potentiometer type temperature controllers, the units meet military specifications. Standard models operate on either gas or electric heat. Oil-fired units are available on special order. So are 1250°F units. This model is a gas-fired one. Its work chamber dimensions are 38 wide x 20 deep x 26-in. high. Over-all dimensions are

56 wide x 32 deep x 63-in. high. A 150,000-btu gas burner is installed. The recirculating air blower is driven by a ¾-hp motor. Standard units come in sizes both larger and smaller than this one. All models feature high pressure, high velocity air circulation moving in a rapid definite pattern through the work space. All have stainless steel interior cabinets. (Grieve-Hendry Co., Inc.)

For more data circle No. 44 on postcard, p. 121

THEY get to take a last look inside

*Standard Oil research
develops method
for inspecting
lubrication
of enclosed parts
without disassembling*



What if you had to make a final inspection of enclosed parts to be sure they were lubricated and you could not do it without disassembling? Standard Oil research scientists have just developed an instrument system that determines lubricant level in an instant. The device measures the density of an assembly so precisely the presence or absence of the desired quantity of lubricant registers on a meter.

Having such a unit might permit you to shorten an assembly line or reorganize assembly operations for greater convenience, speed, economy. The research men at Standard who developed this inspection method will be glad to share their know-how with you to help you fit it to your assembly operations.

This is the research pay-out you get from Standard. This is the "something more" Standard gives to industry besides the research which has established Standard Oil petroleum products as the industry criteria for quality.

For more information about this development or for assistance on other lubrication problems, inquire of any of the 48 Standard Oil district offices in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

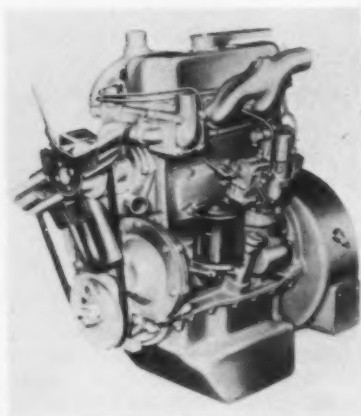
You expect more from



and get it!



NEW EQUIPMENT

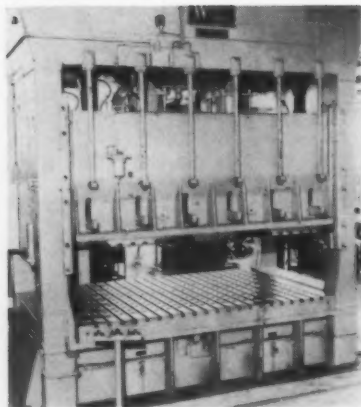


Gasoline, Diesel Engines Are Interchangeable

Six new models have been added to a diesel and gasoline engine maker's line. The new three-cylinder engines expand to 18 the number of the manufacturer's units which feature extreme interchangeability. They are interchangeable as units or even offer extensive interchangeability of parts. Both type engines share many common parts and components extending in some cases over the entire range of models. In the

three-cylinder units, cylinder blocks not only are interchangeable between the gasoline and diesel engines of like size, but they are so designed that they can be turned end for end and the flywheel housing and gear cover bolted to each end, permitting the power to be taken from either end of the engines. (Hercules Motors Corp.)

For more data circle No. 46 on postcard, p. 121

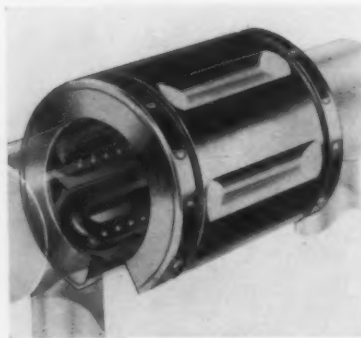


Press Handles Production Deep Drawing Runs

This double back geared, four-point eccentric gear press handles press work done high up on the stroke (i.e., production runs of deep drawn parts). Of welded steel, the press is especially designed to offer high rigidity and strength of frame and drive. It has a capacity $\frac{1}{2}$ -in. from the bottom of the stroke of 300 tons. With a frame of the steel tie rod type, the press features a pneumatic clutch and brake with an

electrical clutch control. Area of the slide is 90 x 136 in., with a stroke of 18 in. The machine operates at 14 strokes a minute. It requires approximately 96 x 190 in. of floor area and weighs about 192,000 lb. The manufacturer has a full line of such presses in single point, two point, and four point models. (The Federal Machine & Welder Co.)

For more data circle No. 47 on postcard, p. 121



Linear Ball Bearings Run In Round Shafts

These linear ball bearings permit use of shaft support members along the length of the shaft traversed by the bearings. Recommended where extreme rigidity or unusually long shafts are a requirement, the bearings run in economical round shafts. Such shafts provide an inexpensive precision ball bearing way to replace more expensive sliding ways.

The open construction of the bearing also permits adjustment of its bore diameter by use of set screws or other clamping arrangements. This feature eliminates shake or play by adjusting for a smooth free-running line-to-line or slight pre-load fit. (Thompson Industries, Inc.)

For more data circle No. 48 on postcard, p. 121



Pneumatic Tools Run Cool Up To 25,000 RPM

Heavy-duty, rotary-vane type pneumatic tools of a new type resemble in general design the manufacturer's well-known pneumatic die grinder. The new units are larger and more powerful, however. They are cool-running up to 25,000 rpm with plenty of power

to maintain high speed even under heavy loads incurred in many types of grinding, burring and finishing operations. Equipped with heavy-duty, sealed ball bearings, spindle and collets they take the punishment of heavy production operations. The tools accept $\frac{3}{8}$ -in.

shanks of wheels, burrs and sanding discs. The pneumatic tools measure 51/64-in. from the center line to the side of the tool. Over-all length is 5 3/4-in. Weight is just 1 lb, 5 oz. (Doeden Tool Corp.)

For more data circle No. 49 on postcard, p. 121

Miller Spindle

This replacement spindle adapts any Bridgeport milling machine for Microbore quick-change tooling. It can reduce downtime on milling, drilling and boring operations. The

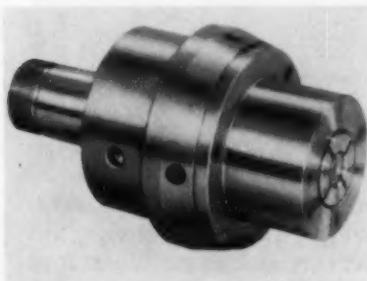


replacement installs easily. Its socket, which is an integral part of the spindle, combines strength and rigidity for roughing operations with accuracy for precise finishing operations. (DeVlieg Machine Co.)

For more data circle No. 59 on postcard, p. 121

Expanding Collets

For precision internal chucking, new expanding collets are said to simplify tooling, handling and machining operations. Using the collets, many important machining operations can be completed in one



chucking. These expanding collet assemblies are precision engineered for the maker's toolroom and production lathes. Exact concentricity of the collet units make it easier to obtain concentric and square shoulders, faces, and diameters from a previously machined bore. The as-

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When One Will Do...



Better!

When *one* Roots-Connorsville rotary gas meter is used in place of *two* . . . or *three* . . . or *four* of other types, metering costs go down.

This fact has been proved by utility companies and commercial and industrial users of gas everywhere as shown in this typical comparison:

Comparison Analysis	SPACE OCCUPIED	TOTAL CAPACITY	METER COST	INSTALLATION COST	TOTAL COST
FOUR DIAPHRAGM METERS	████████	████████	████████	████████	████████
ONE R-C METER	██	████████	██	██	██

First cost is substantially reduced with the proper selection of the *one* Roots-Connorsville meter, from the 39 sizes offered, for a specific requirement. Further savings are made in foundation, piping and installing costs, and in space.

But this is only part of the story. Roots-Connorsville gas meters assure unalterable accuracy with far less maintenance than required by other types. There are no valves, valve gear or other small parts to wear out and cause inaccuracies. Servicing is limited to lubrication of bearings and gears and an occasional check of the operating differential.

For additional data, please refer to our section in *Chemical Engineering Catalog* or *Mechanical Catalog* or write for descriptive Bulletin M-152.



ROOTS-CONNORSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

258 Ohio Avenue, Connorsville, Indiana. In Canada—629 Adelaide St., W., Toronto, Ont.



NEW EQUIPMENT

semblies allow elimination of special shouldered expanding collets, says the manufacturer. Reason: the back stop is machined in place and is a dead stop. Exact work lengths are easily obtained. Both the stationary expanding collet and work locating stop have no end movement. All these expanding collets are standardized and in stock. (Hardinge Brothers, Inc.)

For more data circle No. 51 on postcard, p. 121



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Expansion Reamer

A new carbide tipped expansion machine reamer incorporates several new features. Its method of expansion assures rigidity. Expansion, to compensate for wear,



can be accurately controlled. And this is always uniform throughout the length of the cutting blades. The cutting element can be replaced quickly and economically by removing a worn-out shell and installing a new one. (Staples Tool Co.)

For more data circle No. 52 on postcard, p. 121

Turret Drill

Auto-indexing, this sensitive 3/16-in. capacity bench model turret drill is designed for production of small, delicate parts, requiring extreme accuracy. Numerous second operations, including drilling, tapping, reaming, counterboring, counter-sinking and spotfacing can be performed by one operator without moving the workpiece. It has a capacity of 3/16 in. in steel, 1/4 in. in aluminum. Overall dimensions are: height 31 1/2, width 17, depth 20 in.; machined pad, 8 x 12 in.; base, 16 x 14 1/4 in. Using a 1/4-hp motor, its turret head unit is

mounted on two columns and is easily adjusted to convenient height. Center of spindle to column clearance is 5 3/4 in. Chuck to base clearance is 12 in. Maximum spindle travel is 2 3/4 in. A two-step timing belt drive provides 12 speed ranges: high range, 650 to 6200 rpm; low range, 350 to 330 rpm. (Burgmaster Corp.)

For more data circle No. 53 on postcard, p. 121

Hydraulic Lifter

Constant level feeding provided by new hydraulic lifting equipment. It elevates skid loads, truck loads, or pallet loads to machine or press bed feed-in height. And it keeps the top of the load at any desired level. The operator uses a remote, foot-operated "dead-man" control switch on the end of a 15-ft cable. Of pan-type design, its pan edge is beveled so that it lies flush with the floor. This lets hand pallet trucks, semi-live skids, platform trucks and other equipment roll on the pan with very little effort. The flush-to-floor pan eliminates rehandling. The unit is recom-



mended for feeding such materials as sheet steel into machines and processes as high as 120 in. from the floor. Down height is 1/8 in. flush with the floor. Load capacity is up to 4000 lbs. (Langley Mfg. Co.)

For more data circle No. 54 on postcard, p. 121

Removable-jaw Nippers

Cutting nippers just introduced have jaws that can be removed, re-



World's Best Acid Proof Cement

for Chimneys

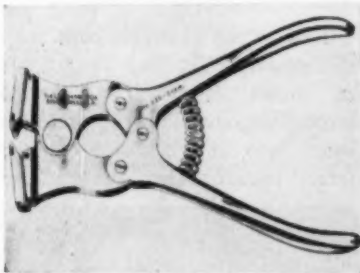
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31-A

Sauereisen Cements Co., Pittsburgh 15, Pa.

ground and adjusted, or replaced. Offered with tungsten carbide tips for extra long life they are available for cutting wire, and with wider opening jaws, for cutting tile. These nippers are of special design to insure powerful leverage for efficient cutting. The jaws are secured in toothed seats by screws and may



be removed and ground after becoming worn. Adjustment allows for grinding back each jaw up to 1/4 in. before replacement is necessary. Head and handles are of drop-forged steel, highly finished; all parts except the jaws are case-hardened. Jaws are high-grade, tempered tool steel fitted with tungsten carbide tips. Two sizes are available: 5 1/2 and 7 in. (L. S. Starrett Co.)

For more data circle No. 55 on postcard, p. 121

No-noise Boring Bar

This chatter-free boring bar has interchangeable heads. These tool heads serve all types of boring operations. The bars and heads come



in sizes and styles for all boring machines. They are made to assure guaranteed repeat accuracies of 0.0001 in. A locking cam, loosened with only one-quarter turn of an allen wrench, permits quick changes without the heads loosening during operations. The tool incorporates a cavity within the bar

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Transfer Many Thermocouples With T-E Quick-Coupling Connectors and Panels

Connector Panels T-E has one for your exact needs. These panels provide flexible, centralized control in transferring any number of thermocouples to indicating, multi-point recording and controlling pyrometers. Ideal for patch panel use, they are available in many compact shapes and sizes — with interchangeable plugs and jacks in I-C, C-C, and C-A. A panel for 48 thermocouples and 16 pyrometers measures only 13 1/4" x 7 7/8". Polarity markings and screw-fastened connections make wiring easy.

Quick-Coupling Connectors These connectors permit fast, easy making and breaking of thermocouple circuits. Durable construction guarantees long, dependable usage. Polarized and mechanically interchangeable, all plugs and jacks are of standard matched thermocouple materials. Spring-loaded contacts with long wiping surfaces provide firm but easily broken connections.

Write for Bulletin 23-N

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In Canada — THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

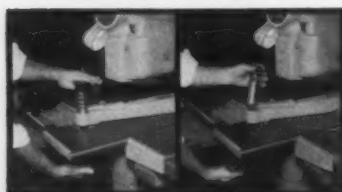


THE STRIPPIT FABRICATOR
— a single compact multi-purpose
Punch Press with quick-change tool
holder, quick-set gauging and stops.

Short run? Complicated pattern? If it's sheet metal up to $\frac{1}{4}$ " mild steel, if it's punching, notching or nibbling, it's profitable on a Strippit Fabricator!

Set up in minutes! Punches and dies are changed in 30 seconds or less, and Strippit guided punches need no aligning or adjusting. Back stop with precision gauge is instantly set by a locking knob. Self-tripping finger stops on gauge bars provide multiple stopping as the work is moved rapidly under the punch. A switch gives you single punching or 165-stroke-a-minute nibbling, and all tools are within quick reach in attached "file drawers" or shelves. The Fabricator is more than a one-machine shop—it's a whole system of quick-change, high-profit fabrication used by thousands of shops.

What's more, you can add the Strippit Positive Duplicator for high-speed punching in medium runs — plus the Dupl-O-Scope to punch Duplicator templates right from the drawing, in a few minutes. Write today for details and demonstration at your plant by the Strippit mobile unit. Warehouse stocks in Chicago and Los Angeles.



TOOL HOLDER is pulled out, for instant removal of die and punch assembly, ready for the next interchangeable tool. $1\frac{1}{4}$ " diameter capacity holder shown, $3\frac{1}{2}$ " diameter holder also available.



WALES STRIPPIT COMPANY
202 Buell Road, Akron, New York

In Canada: Strippit Tool & Machine Limited, Brampton, Ontario

NEW EQUIPMENT

which is loaded with shot. This eliminates vibration and chatter: (Fry Tool Mfg. Co.)

For more data circle No. 56 on postcard, p. 121

Thread Protectors

New thread protector caps snap on instantly. Yet they won't come off unless unscrewed. A metal staple integrated into the protector snaps into and conforms to the thread pattern. Thus, the new cap



can be depended upon to hold firmly regardless of vibration and jarring during shipment, handling, installation or actual plant use, as well as during storage. It's made of plastic-coated Kraft paper. (Precision Paper Tube Co.)

For more data circle No. 57 on postcard, p. 121

Finishing Unit

Speeded-up descaling, deburring, grinding, fine finishing, coloring and burnishing of all metals and many other materials is reported for a new finishing unit. The machine employs a principle of controlled vibration. It isn't just a tumbling barrel with vibration added but a different type of machine altogether. Instead of the workpieces being carried upward with the media to a certain height, from which they cascade downward as the barrel turns, every cubic inch of load in the vibrator unit is in continuous work motion. In addition, there's a "scrubbing action" which is caused by frequency and amplitude. The vibrator removes plenty of metal over a very short period of time,

speeding many finishing jobs. In one test, stock removal of up to 200 microinches was achieved on hard stainless steel turbine blades in 30 minutes. Small parts placed into the unit can be vibrated "free." Heavy parts, though, must be racked or fixtured. When parts are fixtured in the vibrator, time cycle is reduced by 50 pct. A combined descaling and cut-down operation on hand shovels in a test was accomplished in five minutes. Coloring or burnishing took three minutes. (Lord Chemical Co.)

For more data circle No. 58 on postcard, p. 121

High-speed Driller

High-speed hole drilling with a conventional drill press is possible with a new attachment. Making possible speeds up to 30,000 rpm, the tool adapts to virtually any conventional style drill press spindle, quickly converting it into a high speed drilling machine. The unit permits use of solid carbide drills and reamers. It's ideal for high speed drilling of small holes, says the manufacturer. (Jarvis Corp.)

For more data circle No. 59 on postcard, p. 121

Production Micrometer

High precision, motor driven production micrometers now available handle up to 10,000 spherical pieces per hour. Rectangles, squares, tapers and other shapes can also be accommodated. The micrometers are designed to sort and measure small to miniature parts. They precisely classify parts by thickness, in production quantities or small lots. Total tolerances are held down to 0.000030 in. It will operate around the clock with only occasional attention, doing the job of a battery of individual measuring devices. Among parts which the micrometer can sort and grade are: mica discs, instrument pivots, miniature steel balls, germanium and silicone dice, machined spacers, bearings, collars, straight and tapered sleeves and pins, platinum and indium spheres and pellets. (Affiliated Mfrs., Inc.)

For more data circle No. 60 on postcard, p. 121

clear the air for production

Dust produced by grinding, chipping and similar operations is removed as created by down draft dust control systems, pioneered by Kirk & Blum.

Whatever your problem in industrial dust control, call on Kirk & Blum, an organization of engineers and mechanics with 50 years' experience in this specialized field.

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The Iron Age Summary

Steel Order Pickup Cheers Mills

It's too early to say that a definite uptrend is in the making. But mills are hopeful.

Midwest warehouse pickup is another bright spot in otherwise cloudy picture.

■ Steel order volume has picked up slightly within the last several weeks. It's nothing to get too excited about, but steel men are hopeful that the downtrend may have reversed itself.

The pickup in orders probably will not be reflected in a higher steel operating rate for some weeks. Even at present low production levels, the industry is turning out more steel than the improved volume of incoming business.

Warehouse Picture Brightens—Another bright spot in the picture is an improvement in warehouse orders in the Midwest. Some of this warehouse business is labeled "rush rush"—another indication that user

inventories are at low ebb.

Steel men are taking a more realistic attitude toward the business picture. They are not looking at each new order as a sign of better things to come. So the recent slight optimism over incoming tonnages could indicate a genuine feeling that the tide has turned.

Steel Buyers "Shopping"—Many steel users are missing the boat because of last-minute attempts to get steel. They don't get it on time so they turn to another steel company. This shopping around at the last minute is tough on both producers and consumers. And there is a lot of it being done. It could be another indication that the bottom has been reached.

Warehouses in Chicago are encouraged by a recent spurt of large tonnage orders. These are mainly in the strip and sheet category. They run from 20 tons to as much as 50 tons. Immediate delivery is usually specified. Meantime the warehousemen are filling

a large number of very small tonnage orders. As a result of the pickup, the warehouses are revising upward their second quarter business forecasts.

Buyer Sentiment Better—Another straw in the wind: Some steel buyers are indicating they will order slightly more in the next few months than they have been. Seasonal increases are being felt in some wire products, butt-weld pipe, seamless tubing, and others. Incoming orders are even with or ahead of the same time in January, but shipments are generally lagging.

The word from Detroit is still gloomy. The automotive picture gives no sign of brightening.

Auto Output Down—Both Ford and General Motors are reportedly planning to trim their March production schedules. At Chrysler, only the De Soto division is working this week.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,468	1,373	1,459	2,458
Ingot Index				
(1947-1949=100)	91.4	85.5	90.8	153.0
Operating Rates				
Chicago	59.0	59.0	59.0	94.0
Pittsburgh	56.5	55.5	58.0	97.0
Philadelphia	47.5	63.0	63.0	104.0
Valley	43.5	39.0*	45.0	93.0
West	75.5	72.5*	65.5	102.0
Buffalo	39.0	44.0	54.0	95.0
Cleveland	34.0	30.0*	34.0	97.0
Detroit	51.0	51.0*	51.0	106.0
S. Ohio River	52.0	50.0*	59.0	91.0
South	51.5	49.5	52.0	98.5
Upper Ohio R.	60.5	60.0*	58.5	106.0
St. Louis	88.0	83.0*	78.0	82.0
Northeast	31.0	31.0	31.0	76.0
Aggregate		50.9	54.1	96.0

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Nonferrous				
Finished Steel, base	5.967	5.967	5.967	5.663
Pig Iron (Gross ton)	\$66.49	\$66.49	\$66.42	\$62.90
Scrap, No. 1 hvy				
(Gross ton)	\$37.33	\$37.33	\$35.00	\$52.17
No. 2 bundles	\$28.83	\$28.83	\$27.17	\$42.83
Composite price				
Aluminum ingot	28.10	28.10	28.10	27.10
Copper, electrolytic	25.00	25.00	25.00	32.00
Lead, St. Louis	12.80	12.80	12.80	15.80
Magnesium ingot	36.00	36.00	36.00	36.00
Nickel electrolytic	74.00	74.00	74.00	74.00
Tin Straits, N. Y.	95.50	94.125*	94.00	98.50
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

Buyers Control Bearings Market

Customers for bearings can count on getting quick delivery in the current market.

Manufacturers don't expect any sales upsurge until the third quarter.

■ Bearings buyers should pretty much be able to write their own tickets for the next few months. Supplies are high, deliveries are quick, and the selling is competitive.

So far the industry has generally stuck by the price schedules posted last October, when increases were made. But some spot softness is rumored in a few lines. Overall price cuts are doubtful, unless business gets a great deal worse.

However, to win whatever sales are available most producers are anxious to match prices offered by competitors.

Material Inventories High — Deliveries are excellent. They vary from immediately for standard types to 4 to 6 weeks for special miniatures. Producer inventories are high — much too high according to them. The industry feels its capacity is ample, has no significant expansion plans for the near future. Raw materials are almost too easy. "We've got far too much of everything we need stacked out back right now," reports one large producer.

Sales are low, will probably remain that way until the third quarter. Then model changeovers in Detroit should boost business substantially. Bearing makers hope that the auto pickup will spread to other customers. But they see little chance for an overall boost until Detroit speeds up.

Precision Bearings Gain—While

no major technical advances are expected over the next few months, the bearing industry and its product mix have changed radically over the past five years. The industry has completed a significant expansion program, and has been active in developing new types and sizes. Expansion has taken the form both of new plants and modernization of existing facilities.

A major impetus behind the industry's recent growth has been higher demand for precision bearings from various segments of industry. Aircraft and aircraft components have been a prime spur in the development of bearing technology.

As an example, Eclipse-Pioneer Div. of Bendix Aviation Corp. a few years ago used miniature "Inch Series" type bearings for about 10 pct of its bearings needs for aircraft instrument and control components. Today, more than 70 pct of bearing applications are filled by miniatures.

Buyers Reluctant — In addition, bearings per unit have shot up astronomically. While Eclipse - Pioneer still makes some components using 4 to 6 bearings per unit, it is currently turning out systems that require from 240 to 600 bearings apiece.

Despite this great increase in use, low metalworking activity is keenly felt in the bearing industry. Customers are not only turning out fewer bearing-containing units, they are also cutting stocks of bearings on hand. Few large users appear to have any plans to step up buying either for use or inventory until their own operations pick up. And a competitive market with ample supplies and fast deliveries convinces buyers that their present low-volume policy is safe and sound.



HANDLE WITH CARE: Designed for service underground as valves in oil well pumps, these stainless steel bearings get careful check in inspection station at the manufacturing plant of SKF Industries, Inc.

THE ALUMINUM MAN . . . He'll put you on the right track with Alcoa's new **Abrasive Tread Plate**. The *Aluminum Man* who represents your nearby Alcoa distributor now stocks Alcoa® Aluminum Abrasive Tread Plate to help your employees keep their "feet on the ground." This safest of all floor surfaces gets its *braking* power from the same diamond-hard material that gives a grinding wheel its *biting* power. Easily installed, permanent and maintenance-free, Alcoa's slip-proof Abrasive Tread Plate prevents costly "slip-ups" in your plant even when oil soaked. Call your "Aluminum Man" *now*—before the next accident has a chance to happen.



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Rhode Island
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Metal Goods Corp.

TEXAS
Dallas
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Metal Goods Corp.

UTAH
Salt Lake City
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Pacific Metal Co.

WISCONSIN
Milwaukee
Central Steel & Wire Company
Steel Sales Co. of Wisconsin

Aluminum Products—Hawaii, Honolulu 14, HAWAII

Aluminum Company of America, 958-B Alcoa Building, Pittsburgh 19, Pennsylvania

Heavy Steel Market Continues Slow

Mill delivery estimates are still falling for heavy plate, structurals, and linepipe.

Export prices on sheet and strip are dropped from \$3 to \$6 by U. S. Steel Export.

■ Mill delivery estimates for heavy plate, structurals, linepipe, and oil country pipe and tube continue shortening.

With shipping schedules already as tight as they can get for other steel products—sheet, strip, wire, bar, and butt-weld pipe—it's the heavier steel products which are now slowing up.

However, in the latest IRON AGE check of delivery promises by districts, two market areas, Cleveland and Detroit, show a drop since the end of January of about a week to fill sheet and strip orders.

Depends on Timing—The de-

cline in delivery time for structurals is mainly on the short side, falling from a previous 2 to 8 weeks to a present 1-6. This means that if finished steel is available or a rolling of the required size near, the product may even be shipped in days. On the other hand, if the customer request just misses a rolling, 6 or 8 weeks will be required to fill the order.

Shortening in linepipe delivery schedules, from months down to 2-6 weeks, reflects the halt in pipeline construction following the Memphis decision. Oil country goods are moving more slowly as buyers continue inventory cutbacks.

Export Price Cut—United States Steel Export Co., effective Feb. 21, announced reductions in its export base prices of some products to "bring them more in line with domestic delivered prices at seaboard and enable them to be distributed

more effectively in foreign markets."

The new prices, per 100 lb, with freight included to New York, Philadelphia or Baltimore are as follows: hot-rolled sheet (18 gage and heavier)—5.14; cold-rolled sheet—6.49; galvanized sheets—6.74; long terne sheets—7.80; vitrenamel sheets—7.13; and cold-rolled strip (.25 pct carbon and under)—7.67. At the end of January U. S. Export dropped prices on rails, joint bars, and tie plates.

Sheet and Strip—With last minute ordering making the difference, March tonnages could show a gain or a decline from February levels. Many producers, however, have about written off the first quarter. If improvement in the market comes, they believe, it will be in April or May.

Plate and Structurals—Customer inventory reductions continue to hurt the heavy steel market. Consumers in the Midwest who had already announced plate reductions in March are going to make further cuts during the second quarter. The approach of the spring construction season has stimulated some limited buying by structural fabricators.

Bethlehem Steel will shut down its 160-in sheared plate mill at Sparrows Pt. on April 21 in order to tie in newly completed finishing facilities. Production is scheduled to be resumed early in May.

Iron Ore Prices—Prices of iron ore delivered during the 1958 shipping season will probably remain unchanged from 1957 levels. A leading ore supplier, Cleveland Cliffs Iron Co., has announced its prices will stay the same this year as last.

Pipe and Tubing—Some seasonal improvement is helping the market for standard pipe as distributors stock up for the coming construction season. National Tube Div. of U. S. Steel is recalling about 1000 fur-loughed workers at the firm's Lorain Works.

Delivery Promises at a Glance

	Pittsburgh	Chicago	Cleveland	Detroit	East	West Coast
CR Carbon Sheet	2-4 wks	1-4 wks	2-4 wks	2-4 wks	3-6 wks	4 wks
HR Carbon Sheet	1-2 wks	1-2 wks	1-3 wks	1-3 wks	2-4 wks	3-4 wks
CR Carbon Strip	2-4 wks	1-4 wks	2-4 wks	2-4 wks	3-6 wks	4 wks
HR Carbon Strip	1-2 wks	1-2 wks	1-3 wks	1-3 wks	2-4 wks	3-4 wks
HR Carbon Bars	1-2 wks	1-2 wks	2 wks	1-2 wks	2-4 wks	2-4 wks
CF Carbon Bars	1-4 wks	1-3 wks	1 wk	1-2 wks	1-3 wks	1-2 wks
Heavy Plate	1-8 wks	2-4 wks			3-6 wks	4-6 wks
Light Plate	1-3 wks	1-2 wks	1-3 wks		2-4 wks	4-6 wks
Merchant Wire	1 wk	1 wk	1 wk		Stock	3-4 wks
Oil Country Goods	1-3 wks	1-2 wks	2-3 wks		1-4 wks	
Linepipe	1-8 wks	1-4 wks	3-6 wks		2-4 wks	5-6 wks
Buttweld Pipe	1 wk	1 wk	1 wk	1 wk	Stock	2-4 wks
Std. Structurals	1-5 wks	1-3 wks		1-4 wks	1-6 wks	4-6 wks
CR Stainless Sheet	2-4 wks		1-2 wks	1-2 wks	2-4 wks	
CR Stainless Strip	2-3 wks		1-2 wks	1-2 wks	2-4 wks	

COMPARISON OF PRICES

(Effective Feb. 25, 1958)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Feb. 25 1958	Feb. 18 1958	Jan. 28 1958	Feb. 26 1957
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate	5.12	5.12	5.12	4.87
Plates, wrought iron	13.15	13.15	13.15	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	50.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$10.30	\$10.30	\$10.30	\$9.95
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.65
Special coated mfg. ternes	9.55	9.55	9.55	9.20
Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	43.25
Wrought iron bars	14.45	14.45	14.45	11.50
Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢
Rails: (per 100 lb.)				
Heavy rails	\$5.525	\$5.525	\$5.525	\$5.075-5.275
Light rails	6.50	6.50	6.50	6.00-6.25
Semifinished Steel: (per net ton)				
Revoling billets	\$77.50	\$77.50	\$77.50	\$74.00
Slabs, reolling	77.50	77.50	77.50	74.00
Forging billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225
Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.663¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Feb. 25 1958	Feb. 18 1958	Jan. 28 1958	Feb. 26 1957
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$70.97	\$70.97	\$70.51	\$66.85
Foundry, Valley	66.50	66.50	66.50	63.00
Foundry, Southern Cin'ti	73.87	73.87	71.65	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	63.00
Basic, del'd Philadelphia	70.47	70.47	70.01	66.38
Basic, Valley furnace	66.00	66.00	66.00	62.50
Malleable, Chicago	66.50	66.50	66.50	63.00
Malleable, Valley	66.50	66.50	66.50	63.00
Ferromanganese, 74-76 pct Mn, cents per lb	12.25	12.25	12.25	12.75
Pig Iron Composite: (per gross ton)				
Pig iron	\$66.49	\$66.42	\$66.42	\$62.90
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$36.50	\$36.50	\$33.50	\$52.50
No. 1 steel, Phila. area	38.00	38.00	38.00	55.50
No. 1 steel, Chicago	37.50	37.50	33.50	48.50
No. 1 bundles, Detroit	29.50	29.50	23.50	44.50
Low phos., Youngstown	38.50	38.50	35.50	53.50
No. 1 mach'y cast, Pittsburgh	56.50	49.50	49.50	56.50
No. 1 mach'y cast, Phila.	47.50	47.50	47.50	57.50
No. 1 mach'y cast, Chicago	49.50	49.50	47.50	50.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	\$37.33	\$37.33	\$35.00	\$52.17
No. 2 bundles	28.83	28.83	27.17	42.83
Coke Connellville: (per net ton at oven)				
Furnace coke, prompt	\$15.38	\$15.38	\$15.38	\$15.38
Foundry coke, prompt	\$17.50-\$19	\$17.50-\$19	\$17.50-\$19	\$17.50-\$19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	25.00	25.00	25.00	32.00
Copper, Lake, Conn.	25.00	25.00	25.00	32.00
Tin, Straits, N. Y.	95.50†	94.125*	94.00	98.50
Zinc, East St. Louis	10.00	10.00	10.00	13.50
Lead, St. Louis	12.80	12.80	12.80	15.80
Aluminum, virgin ingot	28.10	28.10	28.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	33.00	33.00

† Tentative. * Average. * Revised.

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Can Market Hold Its Recent Gains?

Bad weather may have prevented a drop this week. Most bullish factors have disappeared from the market.

Some strength is indicated along the East Coast from increased export activity.

■ The bulls have retreated and the market is in a state of stalemate.

There are few reasons to look for higher prices in the face of a still declining steel market. The question is whether recent gains will hold.

Lower prices might have materialized this week, but bad weather throughout most of the eastern half of the nation brought scrap activity to a standstill. With scrap unable to move anywhere, there was little incentive to move prices either up or down.

Any trend should be reflected in auto lists, closing this week. The lists are small enough to arouse some bidding. But, at the same time, they indicate a dismal rate of auto production that could have a further depressing effect on the steel market itself.

The only bullish factor anywhere is some stronger export predicted for March from East Coast ports.

Both IRON AGE Composite Prices are unchanged. No. 1 heavy melting stands at \$37.33, No. 2 bundles at \$28.83.

Pittsburgh—Prices of openhearth grades are unchanged as the recent cold weather has combined with low prices and production slashes to reduce yard intake still further. In this situation, dealer resistance con-

tinues. One local mill has paid up to \$38 for No. 1 heavy melting.

Chicago—The market appeared momentarily deadlocked, with little action. Turnings moved briefly to \$24 for machine shop turnings and \$26 for shoveling turnings, but the offer was reportedly withdrawn following heavy selling offers at these prices. There is little real weakening in the current market on the basis of mill sales, with major mills continuing to buy at previous prices. Declines are expected in the near future, however. Correct price for RR couplers and knuckles in Feb. 20 issue should have been \$47 to \$48.

Philadelphia—For the third week prices here were kept in balance by two counter-pressures—export strength and domestic weakness. Because export prospects for March look fairly good, there is assurance that prices will at least hold to present levels for a while.

New York—The market remains quiet, with export shipments holding prices at last week's levels. A new cast purchase by a leading consumer confirms present prices. Clean cast chemical borings are up \$2.

Detroit—Dealers who harbored slightly bullish attitudes in the past several weeks have pulled in their horns. Possible increased steel production in March is the key to a stronger market. But hopes are tempered by a look at industrial scrap offerings. March lists offer only 30 pct of the No. 1 bundles offered a year ago in Michigan and even less within Detroit. Machine

shop turnings were incorrectly quoted last week. Correct price was \$10 to \$11.

Cleveland—Auto production lists were expected to go up this week because tonnage is off. Total for the Cleveland area is only about 15,000 tons compared with over 20,000 a month ago, a good part of which didn't materialize. Dealer price might go up sympathetically on a representative mill order.

St. Louis—Steel mills have not changed their buying prices, although a Kansas City purchaser bought a tonnage at \$3 over the current price level. A large outside consumer upped turnings prices by \$1.

Birmingham—The market in this district has even the brokers confused. Some consumers have heavy inventories and are completely out of the market, while others, seeking to buy at prevailing levels, find most dealers unwilling to sell at those prices.

Cincinnati—The markets stalemate continues with dealers holding scrap and mills not eager to get it. Brokers continue having trouble covering orders. Continuing area foundry strike is also cutting into the cast market, but cupola cast is finding a demand in northeastern Ohio.

Buffalo—Prices remain unchanged in a dormant market. Dealers report low scrap inventories and movement continues slow. There is a feeling that if a sale were made, it would not be at higher prices, especially now with the low operating rate.

Boston—The market continues drab, with little change in condition. The trade is extremely inactive. Prices of No. 1 dealer bundles are off \$1, but with busheling up \$2 in some adjusting of levels.

West Coast—Recent wet weather has reduced scrap flow to a trickle. The market remains dull. One major mill is buying a bit more than it is consuming.

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SCRAP PRICES

(Effective Feb. 25, 1958)

Pittsburgh

No. 1 hvy. melting	\$36.00 to \$37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	38.00 to 39.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and ms. turn.	17.00 to 18.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Low phos. punch'gs plate	39.00 to 40.00
Heavy turnings	35.00 to 36.00
No. 1 RR hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	50.00 to 51.00
Rails 2 ft and under	55.00 to 56.00
RR steel wheels	48.00 to 49.00
RR spring steel	48.00 to 49.00
RR couplers and knuckles	48.00 to 49.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	39.00 to 40.00

Chicago

No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	38.00 to 39.00
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	23.00 to 24.00
Low phos. forge crops	51.00 to 52.00
Low phos. punch'gs plate	46.00 to 47.00
Low phos. 3 ft and under	44.00 to 45.00
No. 1 RR hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	50.00 to 51.00
Rerolling rails	55.00 to 56.00
Rails 2 ft and under	57.00 to 58.00
Locomotive tires cut	50.00 to 51.00
Cut bolsters & side frames	47.00 to 48.00
Angles and splice bars	51.00 to 52.00
RR steel car axles	55.00 to 56.00
RR couplers and knuckles	47.00 to 48.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoe	40.00 to 41.00
Cast iron wheels	37.00 to 38.00
Malleable	53.00 to 54.00
Stove plate	40.00 to 41.00
Steel car wheels	50.00 to 51.00

Philadelphia Area

No. 1 hvy. melting	\$37.50 to \$38.50
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	35.50 to 36.50
No. 2 bundles	27.00 to 28.00
No. 1 busheling	37.50 to 38.50
Machine shop turn.	20.00 to 21.00
Mixed bor. short turn.	21.00 to 22.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Clean cast. chem. borings	32.00 to 33.00
Low phos. 5 ft and under	42.00 to 43.00
Low phos. 2 ft and under	43.00 to 44.00
Low phos. punch'gs	43.00 to 44.00
Elec. furnace bundles	39.00 to 40.00
Heavy turnings	33.00 to 34.00
RR steel wheels	45.00 to 46.00
RR spring steel	45.00 to 46.00
Rails 18 in. and under	58.00 to 60.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	40.00 to 41.00
Cast iron car wheels	40.00 to 41.00
Malleable	57.00 to 58.00
Unstripped motor blocks	32.00 to 33.00
No. 1 machinery cast.	47.00 to 48.00

Cleveland

No. 1 hvy. melting	\$33.50 to \$34.50
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	33.50 to 34.50
No. 1 factory bundles	37.50 to 38.50
No. 2 bundles	25.00 to 26.00
No. 1 bushelings	33.50 to 34.50
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Cut struct'l & plates, 2 ft & under	40.00 to 41.00
Drop forge flashings	33.50 to 34.50
Low phos. punch'gs plate	34.50 to 35.50
Foundry steel, 2 ft & under	36.00 to 37.00
No. 1 RR heavy melting	42.00 to 43.00
Rails 2 ft and under	56.00 to 57.00
Rails 18 in. and under	57.00 to 58.00
Railroad grate bars	17.00 to 18.00
Steel axle turnings	18.00 to 19.00
Railroad cast.	49.00 to 50.00
No. 1 machinery cast.	47.00 to 48.00
Stove plate	45.00 to 46.00
Malleable	61.00 to 62.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$37.50 to \$38.50
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	37.50 to 38.50
No. 2 bundles	28.00 to 29.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. plate	38.00 to 39.00

Buffalo

No. 1 hvy. melting	\$28.00 to \$29.00
No. 2 hvy. melting	25.50 to 26.50
No. 1 busheling	28.00 to 29.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	22.50 to 23.50
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	14.00 to 15.00
Low phos. plate	34.00 to 35.00
Scrap rails, random lgth.	40.00 to 41.00
Rails 2 ft and under	50.00 to 51.00
RR steel wheels	37.00 to 38.00
RR spring steel	33.00 to 34.00
RR couplers and knuckles	33.00 to 34.00
No. 1 machinery cast.	45.00 to 46.00
No. 1 cupola cast.	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	28.00 to 29.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	11.00 to 12.00
Low phos. punch'gs plate	20.00 to 21.00
No. 1 cupola cast.	34.00 to 35.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	27.00 to 28.00
Automotive cast.	36.00 to 37.00

St. Louis

No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
No. 1 RR hvy. melting	38.00 to 39.00
Rails, random lengths	48.00 to 49.00
Rails, 18 in. and under	55.00 to 56.00
Angles and splice bars	47.00 to 48.00
Std. steel car axles	50.00 to 51.00
RR specialties	44.00 to 45.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	32.00 to 33.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	38.00 to 39.00
Cast iron car wheels	37.00 to 38.00
Rerolling rails	56.00 to 57.00
Unstripped motor blocks	35.00 to 36.00

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$27.00 to \$28.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	17.50 to 18.50
No. 1 busheling	26.00 to 27.00
Elec. furnace, 3 ft & under	31.00 to 32.00
Machine shop turn.	9.50 to 10.50
Mixed bor. and short turn.	9.50 to 10.50
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	18.00 to 19.00
No. 1 machinery cast.	32.00 to 33.00
Mixed cupola cast.	28.00 to 29.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	36.00 to 37.00
Unstripped motor blocks	26.00 to 27.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	29.00 to 30.00
No. 2 dealer bundles	24.00 to 25.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	25.00 to 26.00
No. 1 machinery cast.	34.00 to 35.00
Mixed yard cast.	32.00 to 33.00
Charging box cast.	30.00 to 31.00
Heavy breakable cast.	30.00 to 31.00
Unstripped motor blocks	27.00 to 28.00

Birmingham

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	36.00 to 37.00
Elec. furnace, 3 ft & under	34.00 to 35.00
Bar crops and plate	39.00 to 40.00
Structural and plate, 2 ft.	39.00 to 40.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	43.00 to 44.00
Rails, 18 in. and under	49.00 to 50.00
Angles & splice bars	42.00 to 43.00
Rerolling rails	49.00 to 50.00
No. 1 cupola cast.	50.00 to 51.00
Stove plate	49.00 to 50.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	40.00 to 41.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	24.50 to 25.50
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	15.00 to 16.00
Low phos. 18 in. and under	38.00 to 39.00
Rails, random length	44.00 to 45.00
Rails, 18 in. and under	54.00 to 55.00
No. 1 cupola cast.	41.00 to 42.00
Hvy. breakable cast.	32.00 to 33.00
Drop broken cast.	47.00 to 48.00

San Francisco

No. 1 hvy. melting	\$32.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	28.00
No. 2 bundles	22.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 RR hvy. melting	32.00
No. 1 cupola cast.	40.00

Los Angeles

No. 1 hvy. melting	\$34.00
No. 2 hvy. melting	32.00
No. 1 dealer bundles	30.00
No. 2 bundles	22.00
Machine shop turn.	11.00 to 12.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Elec. furn. 1 ft and under (foundry)	45.00
No. 1 RR hvy. melting	34.00
No. 1 cupola cast.	38.00

Seattle

No. 1 hvy. melting	\$30.00
No. 2 hvy. melting	28.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

No. 1 hvy. melting	\$32.00
No. 2 hvy. melting	27.00
No. 1 dealer bundles	32.00
No. 2 bundles	24.00
Mixed steel scrap	27.00
Busheling	22.00
Bush., new fact, prep'd	23.00
Bush., new fact, unprep'd	26.00
Machine shop turn.	17.00
Short steel turn.	21.00
Mixed bor. and turn.	17.00
Rails, rerolling	41.00
Cast scrap	\$44.00 to 47.00

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Scrap

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Trade Is Watching Washington

Quiet market shifts the spotlight to Washington.

Interior Dept. is working on a new minerals program.

Several hearings set for March, Tariff Commission says findings on lead-zinc will be ready by March.

■ With current soft markets showing little tendency toward immediate recovery, nonferrous interest this week was focused on Washington.

In an action affecting all nonferrous metals, Interior Secretary Fred Seaton announced his department is preparing another long-range minerals program for congressional consideration. His initial program, featuring sliding scale tariffs and exploration projects, was sent to Congress late last year. There was a lot of comment, some hearings, but nothing was done. Mr. Seaton did not indicate what the mainstays of the new plan would be.

New Program — The Interior Secretary is scheduled to be the first witness before hearings of the Senate Interior subcommittee on minerals. The date was announced this week as March 24. Mr. Seaton is expected to give more details at that time.

He will be followed on the stand by Commerce Secretary Weeks, and representatives of other federal minerals agencies. The aim of the group, says its chairman, Sen. James Murray (D., Mont.), is to supplement and correlate "specific proposals for the relief of an indi-

vidual (mineral) commodity."

Other capital news affecting specific metals:

Aluminum — The House small business subcommittee announced new hearings to be held March 11 to 13 on the aluminum industry. The chairman of the group is Sidney R. Yates (D., Ill.). Many trade sources are predicting fireworks.

Scheduled to appear are those primary producers which have not yet testified before the subcommittee—Aluminium Ltd., Anaconda, Olin-Mathieson, and Harvey. Although the specific witnesses haven't been lined up yet, the group will also hear from independent die-casters, smelters, and extruders.

The overall question is the future of small business in the aluminum industry. With today's severe competition there are some sharp differences of opinion among producers and small fabricators. There has even been some hard feelings reported, and all this is expected to come out at the hearings.

Lead-Zinc — The Tariff Commission is being pushed to expedite its recommendation to the White House on the request by the domestic lead and zinc miners for an increase in tariff rates.

A commission representative says the number of letters being received on the case is unusually large. The White House reports it received telegrams from about 1300 people in favor of the higher tariff. And the House Ways and Means Committee pressed Chairman Edgar Brossard to be specific on when and what.

The group refuses to be pinned down. It says its statisticians are

winding up the report now. It compliments the industry on the whole for cooperating, but says several people were late returning questionnaires, which held things up. It denies reports of White House pressure to shelve the report, says it should reach the President's desk in March. Disclosure of the report's contents will have to come from the White House, says Chairman Brossard.

Copper—T. E. Veltfort, managing director, Copper and Brass Research Assn., addressed the Plumbing Brass Institute in New York with words aimed at Washington. He says the extension of the Trade Agreements Act should be limited to one or two years. The Administration is asking for a five-year extension and more tariff cutting rights for the President.

Mr. Veltfort would like more power for the Tariff Commission: Decisions of the group on the "escape clause" of the act should be final, subject to veto only when conflicting directly with foreign policy.

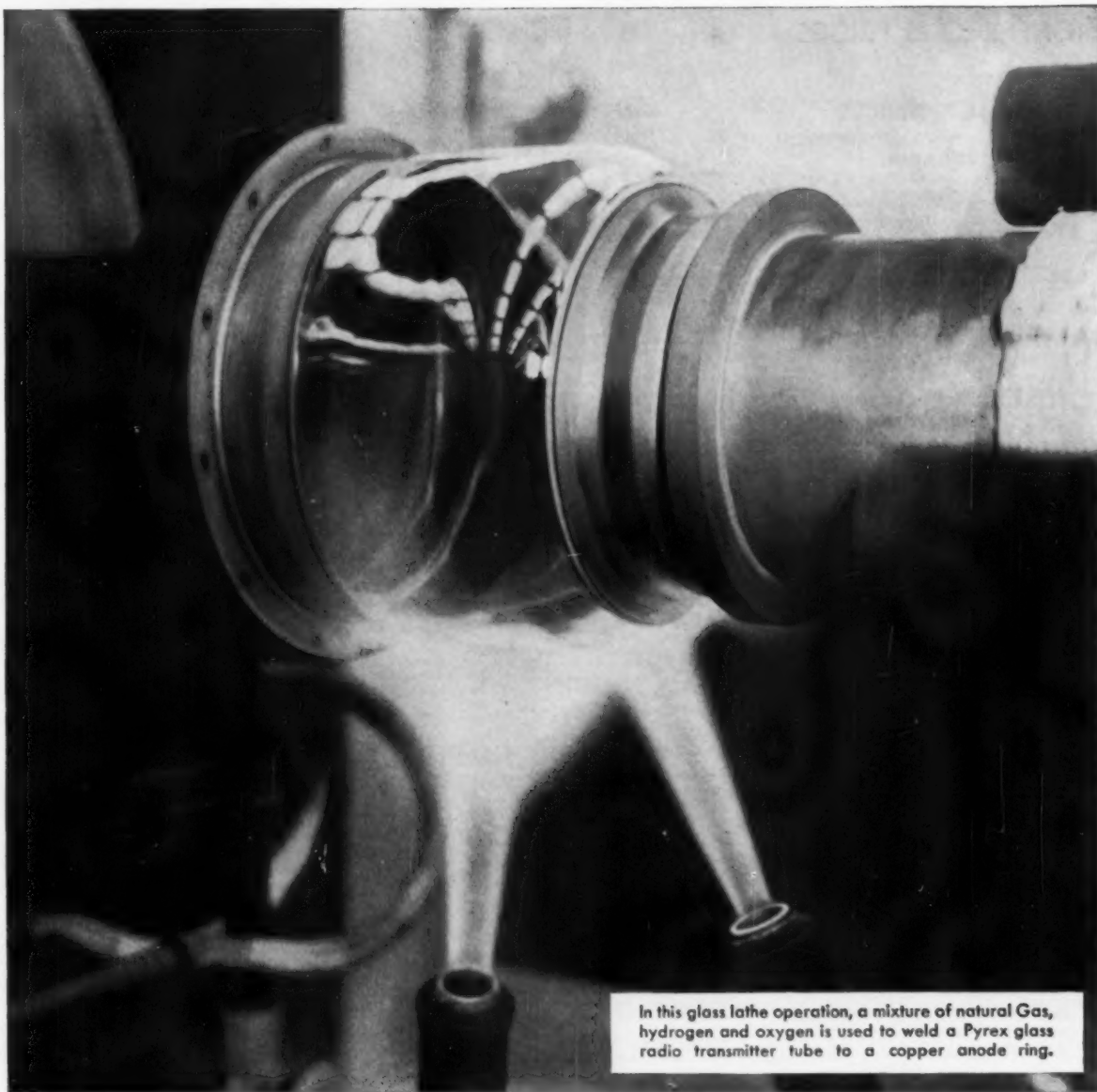
Tin prices for the week: Feb. 19—94.375; Feb. 20—94.50; Feb. 21—94.625; Feb. 24—95.375; Feb. 25—95.50.*

* Estimate

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum pig	26.00	25.00	8/1/57
Aluminum Ingot	26.10	27.10	8/1/57
Copper (E)	25.00	27.00	1/13/58
Copper (CS)	23.50	24.00	2/11/58
Copper (L)	25.00	27.00	1/13/58
Lead, St. L.	12.00	13.30	12/2/57
Lead, N. Y.	13.00	13.00	12/2/57
Magnesium Ingot	38.00	34.00	8/13/58
Magnesium pig	38.25	33.75	8/13/58
Nickel	74.00	64.00	12/6/58
Titanium sponge	200-250	165-200	1/29/58
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig, Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **ZINC:** prime western. **TIN:** see above; other primary prices, pg. 150.



In this glass lathe operation, a mixture of natural Gas, hydrogen and oxygen is used to weld a Pyrex glass radio transmitter tube to a copper anode ring.

RCA welds glass to metal at over 2000° F. ...thanks to **GAS**

Natural Gas is used to weld glass to metal in the production of radio and television tubes of many types at the RCA Tube Division plant in Lancaster, Pennsylvania.

To effect the weld at over 2000° F., a mixture of natural Gas, hydrogen and oxygen maintains the high welding temperature on the Pyrex glass and metal parts as they rotate on a glass lathe. A Gas flame is then used to control and equalize the cooling of the glass down to the 900-600° F. range.

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NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate
("F" temper except 6061-0)

Alloy	.032	.081	.136- .249	.250- 3
1100, 3003	46.6	44.3	43.6	42.7
5052	54.0	48.9	47.2	45.4
6061-0	51.4	47.0	45.2	45.1

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	45.0-46.8	60.4-64.1
12-14	45.7-47.2	61.3-65.8
24-26	49.0-49.5	72.1-76.8
36-38	58.0-58.6	96.2-99.8

Screw Machine Stock—2011-T-3

Size"	1/4	3/8-5/8	3/4-1	1 1/4-1 1/2
Price	63.0	62.5	61.0	58.6

Roofing Sheet, Corrugated (Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	\$1.420	\$1.893	\$2.367	\$2.839
.024 gage	1.774	2.366	2.957	3.548

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓	Gage→	250	250-	.188	.081	.032
AZ31B Stand, Grade		67.9	69.0	77.9	108.1	
AZ31B Spec.		93.3	95.7	108.7	171.3	
Tread Plate		70.6	71.7			
Tooling Plate	73.0					

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade.. (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

"A" Nickel Monel Inconel

Sheet, CR	126	106	128
Strip, CR	134	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks		87	

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	48.13	45.36	48.32	
Brass, 70/30	42.89	43.23	42.63	45.00
Brass, Low	44.90	45.44	44.84	47.71
Brass, R L	45.67	46.21	45.61	48.48
Brass, Naval	47.07	41.38	50.48	
Monel Metal	45.19	41.00		
Comm. Bs.	46.98	47.52	46.92	49.54
Mang. Bs.	50.81	44.91		
Phos. Bs. 5%	67.17	67.67		

Free Cutting Brass Rod 31.03

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$9.50-\$10.60; alloy, \$14.75; Plate, HR, commercially pure, \$8.00-\$8.75; alloy, \$10.75. Wire, rolled and/or drawn, commercially pure, \$7.50-\$8.00; alloy, \$10.00. Bar, HR or forged, commercially pure, \$6.15-\$6.40; alloy, \$6.15-\$6.35; billets, HR, commercially pure, \$6.00-\$6.25; alloy, \$6.00-\$6.20.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex., 29.50
Beryllium aluminum 5% Be, Dollar
per lb contained Be \$74.75
Beryllium copper, per lb contained Be \$43.00
Beryllium 97% lump or beads, \$71.50
Bismuth, ton lots, Reading \$2.25
Cadmium, de'd \$1.55
Calcium, 99.9% small lots \$4.55
Chromium, 99.8% metallic basis \$1.31
Cobalt, 97-99% (per lb) \$2.00 to \$2.07
Germanium, per gm, f.o.b. Miami, Okla., refined \$39.50 to \$51.00
Gold, U. S. Treas. per troy oz. \$35.00
Iridium, 99.9%, dollars per troy oz. \$2.25
Iridium, dollars per troy oz. \$30 to \$90
Lithium, 98% \$11.00 to \$14.00
Magnesium, sticks, 100 to 500 lb., 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York \$222 to \$227
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz. \$19 to \$21
Platinum, dollars per troy oz. \$72 to \$75
Rhodium \$120.00 to \$125.00
Silver ingots (¢ per troy oz.) \$8.625
Thorium, per kg. \$43.00
Vanadium \$3.45
Zirconium sponge \$5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	
No. 115	25.75
No. 120	24.75
No. 123	24.00
80-10-10 ingot	
No. 305	29.75
No. 315	27.75
88-10-2 ingot	
No. 210	36.75
No. 215	32.50
No. 245	29.25
Yellow ingot	
No. 405	21.25
Manganese bronze	
No. 421	23.00

Aluminum Ingot

(Cents per lb de'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	24.75-25.75
0.60 copper max.	24.50-25.50
Piston alloys (No. 122 type)	23.75-24.50
No. 12 alum. (No. 2 grade)	21.00-21.75
108 alloy	21.25-22.25
195 alloy	24.00-25.50
13 alloy (0.60 copper max.)	21.50-22.50
AXS-679	21.25-22.25

(Effective Feb. 24, 1958)

Steel deoxidizing aluminum, notch bar
granulated or shot

Grade 1—85-97 1/2%	22.00-23.00
Grade 2—92-95%	21.00-21.75
Grade 3—90-92%	20.00-20.75
Grade 4—85-90%	17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	21	20 1/2
Yellow brass	16 1/4	14 1/2
Red brass	18 1/2	17 1/2
Comm. bronze	19 1/4	18 1/2
Mang. bronze	14 1/2	14 1/2
Yellow brass rod ends	15 1/2	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	19
No. 2 copper wire	17 1/2
Light copper	15 1/4
*Refinery brass	17
Copper bearing material	16 1/2
*Dry copper content	

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	19
No. 2 copper wire	17 1/2
Light copper	15 1/4
No. 1 composition	17 1/4-17 1/2
No. 1 comp. turnings	16 1/2-17
Hvy. yellow brass solids	12 1/4-12 1/2
Brass pipe	14
Radiators	13 1/4-13 1/2

Aluminum

Mixed old cast	12 1/2-13 1/2
Mixed new clips	14 1/2-15 1/2
Mixed turnings, dry	13-14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	17-17 1/2
No. 2 copper wire	15-15 1/2
Light copper	13-13 1/2
Auto radiators (unswaged)	11-11 1/2
No. 1 composition	14 1/2-15
No. 1 composition turnings	13 1/2-14
Cocks and faucets	11 1/2-12
Clean heavy yellow brass	11-11 1/2
Brass pipe	12-12 1/2
New soft brass clippings	12 1/2-13
No. 1 brass rod turnings	10-10 1/2

Aluminum

Alum. pistons and struts	5 1/2-6
Aluminum crankcases	10-10 1/2
1100 (2S) aluminum clippings	13-13 1/2
Old sheet and utensils	10-10 1/2
Borings and turnings	6 1/2-7
Industrial castings	10-10 1/2
2024 (24S) clippings	11 1/2-12

Zinc

New zinc clippings	4-4 1/2
Old zinc	3-3 1/4
Zinc routings	1 1/2-2
Old die cast scrap	1 1/2-1 3/4

Nickel and Monel

Pure nickel clippings	42-45
Clean nickel turnings	37-40
Nickel anodes	42-45
Nickel rod ends	42-45
New Monel clippings	28-29
Clean Monel turnings	20-23
Old sheet Monel	25-26
Nickel silver clippings, mixed	15
Nickel silver turnings, mixed	15

Lead

Soft scrap lead	8 1/2-9
Battery plates (dry)	3 1/2-3 3/4
Batteries, acid free	2 1/2-2 3/4

Miscellaneous

Block tin	75-76
No. 1 pewter	59-60
Auto babbitt	39-40
Mixed common babbitt	11-11 1/2
Solder joints	14 1/2-15
Siphon tops	12-12 1/4
Small foundry type	12-12 1/4
Monotype	12-12 1/4
Lino. and stereotype	11-11 1/4
Electrotype	10-10 1/4
Hand picked type shells	7-7 1/2
Lino. and stereo. dross	3-3 1/4
Electro dross	2 1/2-2 3/4

special steels

for industry

stainless steels	pg. 2-11
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tool steels	pg. 14-15
sales offices	pg. 16



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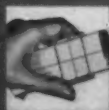
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STAINLESS STEEL IN PRODUCT DESIGN . . . 40 pages of useful engineering and fabricating data including practical examples showing where, when, how stainless steel improves design, adds benefits, helps sales. Information includes: standard sizes and shapes; designing for lower costs in forming, joining, finishing, etc. with many pictures of actual products made and designed in stainless steel.

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As the major producer of special alloy steels for industry, Allegheny Ludlum naturally offers much more than steel. Ten strategically located plants provide prompt mill deliveries and stock shipments are made from warehouses in all industrial centers. Staff specialists from the mills working with the sales engineers from the sales office provide assistance when requested. Whenever you have a problem involving stainless, high-temperature, electrical, magnetic or tool steels or sintered carbides, let us help. *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.*

Stainless Steel in Product Design



PUBLICATION LIST



A description of the literature that is available without charge, covering the selection, fabrication and application of stainless and heat-resistant steels, tool and die steels, electrical steels and alloys, and carbide materials of all necessary types.

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IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL
PRICESBILLETS, BLOOMS,
SLABSPIL-
INGSHAPES
STRUCTURALS

STRIP

Carbon
Re-rolling
Net TonCarbon
Forging
Net TonAlloy
Net TonSheet
Steel

Carbon

Hi Str.
Low
AlloyCarbon
Wide
FlangeHot-
rolledCold-
rolledHi Str.
H.R. Low
AlloyHi Str.
C.R. Low
AlloyAlloy
Hot-
rolledAlloy
Cold-
rolled

EAST

Bethlehem, Pa.			\$114.00 B3		5.325 B3	7.80 B3	5.325 B3						
Buffalo N. Y.	\$77.50 R3, B3	\$96.00 R3, B3	\$114.00 R3, B3	6.225 B3	5.325 B3	7.80 B3	5.325 B3	4.925 R3, B3	7.15 S10	7.325 B3			
Phila., Pa.									7.70 P15				
Harrison, N. J.												15.05 C11	
Conschohocken Pa.		\$101.00 A2	\$121.00 A2					4.975 A2	7.20 A2	7.325 A2			
New Bedford, Mass.									7.60 R6				
Johnstown, Pa.	\$77.50 B3	\$96.00 B3	\$114.00 B3		5.325 B3	7.80 B3			7.70 T8			15.40 T8	
Boston, Mass.									7.60 D1				
New Haven, Conn.									7.15 T8				
Baltimore, Md.													
Phoenixville, Pa.					5.325 P2		5.325 P2						
Sparrows Pt., Md.								4.925 B3		7.325 B3			
Bridgport, Wallingford, Conn.			\$114.00 N8						7.60 W1				
Pawtucket, R. I.									7.70 N7			15.40 N7	
Worcester, Mass.									7.70 A5			15.20 T8	

MIDDLE WEST

Alton, Ill.								5.125 L1					
Ashland, Ky.								4.925 A7					
Canton-Massillon, Dover, Ohio		\$96.00 R3	\$114.00 R3, T5						7.15 G4		10.45 G4		14.85 C11
Chicago, Ill.	\$77.50 U1, R3	\$96.00 U1, R3,W8	\$114.00 U1, R3,W8	6.225 U1	5.275 U1, W8,P13	7.75 U1,Y1 W8	5.275 U1	4.925 W8, N4,A1	7.25 A1,T8 M8			8.10 W8, S9,I3	15.05 A1, S9,G4
Franklin Park, Ill.													
Evansville, Ill.													
Cleveland, Ohio									7.15 A5,J3		10.45 A5	8.10 J3	
Detroit, Mich.			\$114.00 R5					5.025 G3, M2	7.25 M2,D1, D2,G3,P11	7.425 G3	10.60 D2 10.55 G3	8.10 G3	
Anderson, Ind.									7.15 G4				
Duluth, Minn.													
Gary, Ind. Harbor, Indiana	\$77.50 U1	\$96.00 U1	\$114.00 U1, Y1		5.275 U1, I3	7.75 U1, I3	5.275 I3	4.925 U1, I3,Y1	7.15 Y1	7.325 U1, I3,Y1	10.60 Y1	8.10 U1, Y1	
Sterling, Ill.	\$77.50 N4				5.275 N4			5.025 N4					
Indianapolis, Ind.									7.30 J3				15.20 J3
Newport, Ky.												8.10 A9	
Middletown, Ohio													
Niles, Warren, Ohio		\$96.00 S1, C10	\$114.00 C10,S1					4.925 R3, S1	7.15 R3,T4 S1	7.325 R3, S1	10.50 S1 10.45 R3	8.10 S1	15.05 S1
Sharon, Pa.													
Owensboro, Ky.	\$77.50 G5	\$96.00 G5	\$114.00 G5										
Pittsburgh, Pa.	\$77.50 U1, P6	\$96.00 U1, C11,P6	\$114.00 U1, C11,B7	6.225 U1	5.275 U1, J3	7.75 U1, J3	5.275 U1	4.925 P6	7.15 J3,B4, S7			8.10 S9	15.05 S9
Midland, Pa.													
Butler, Pa.													
Aliquippa, Pa.													
Weirton, Wheeling, Follansbee, W. Va.				6.225 W3	5.275 W3			4.925 W3	7.15 W3,F3	7.325 W3	10.50 W3		
Youngstown, Ohio	\$77.50 R3	\$96.00 Y1, C10	\$114.00 Y1			7.75 Y1			7.15 Y1,J3	7.325 U1, Y1	10.65 Y1	8.10 U1, Y1	15.05 J3 10.65 Y1

WEST

Fontana, Cal.	\$88.00 K1	\$105.50 K1	\$135.00 K1		6.075 K1	8.55 K1	6.225 K1	5.675 K1	9.00 K1				
Geneva Utah		\$96.00 C7			5.275 C7	7.75 C7							
Kansas City, Mo.					5.375 S2	7.85 S2						8.35 S2	
Los Angeles, Torrance, Cal.		\$105.50 B2	\$134.00 B2		5.975 C7, B2	8.45 B2		5.675 C7, B2	9.05 J3			9.30 B2	17.25 J3
Minneapolis, Cole.					5.575 C6			6.025 C6	9.10 K1				
Portland, Ore.					6.025 O2								
San Francisco, Niles, Pittsburg, Cal.		\$105.50 B2			5.925 B2	8.40 B2		5.675 C7, B2					
Seattle, Wash.		\$109.50 B2			6.025 B2	8.50 B2		5.925 B2					

SOUTH

Atlanta, Ga.					5.475 A8			5.125 A8					
Fairfield, Ala. City, Birmingham, Ala.	\$77.50 T2	\$96.00 T2			5.275 T2, R1,C16	7.75 T2		4.925 T2, R3,C16		7.325 T2			
Houston, Lone Star, Texas		\$101.00 S2	\$119.00 S2		5.375 S2	7.85 S2						8.35 S2	

(Effective Feb. 24, 1958)

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL
PRICES

STEEL PRICES		SHEETS							WIRE ROD	TINPLATE†		BLACK PLATE		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enamel- ing	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.		
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.925 B3	6.05 B3				7.275 B3	8.975 B3	6.15 W6	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct \$2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.00. Differ- ential 1.00 lb. 0.25 lb. add 65¢.				
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.975 A2	6.10 A2				7.325 A2							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.								6.15 B3					
	Fairless, Pa.	4.975 U1	6.10 U1				7.325 U1	9.025 U1		\$10.15 U1	\$8.85 U1			
	New Haven, Conn.													
	Phoenixville, Pa.													
Sparrows Pt., Md.	4.925 B3	6.05 B3	6.60 B3			7.275 B3	8.975 B3	9.725 B3	6.25 B3	\$10.15 B3	\$8.85 B3			
Worcester, Mass.									6.45 A5					
Trenton, N. J.														
MIDDLE WEST	Alton, Ill.									6.35 L1				
	Ashland, Ky.	4.925 A7		6.60 A7	6.625 A7									
	Canton-Massillon, Dover, Ohio			6.60 R3, R1										
	Chicago, Joliet, Ill.	4.925 W8, A1					7.275 U1			6.15 A5, R3, W8, N4, K2				
	Sterling, Ill.									6.25 N4, K2				
	Cleveland, Ohio	4.925 R3, J3	6.05 R3, J3		6.625 R3		7.275 R3, J3	8.975 R3, J3		6.15 A5				
	Detroit, Mich.	5.625 G3, M2	6.15 G3 6.05 M2				7.375 G3	9.075 G3						
	Newport, Ky.	4.925 A1	6.05 A1											
	Gary, Ind. Harbor, Indiana	4.925 U1, I3, Y1	6.05 U1, I3, Y1	6.60 U1, I3	6.625 U1, I3, Y1	7.00 U1	7.275 U1, Y1, I3	8.975 U1, Y1		6.15 Y1	\$10.05 U1, Y1	\$8.75 I3, U1, Y1	7.50 U1, Y1	
	Granite City, Ill.	5.125 G2	6.25 G2	6.80 G2	6.825 G2							\$8.85 G2	7.60 G2	
	Kokomo, Ind.			6.70 C9						6.25 C9				
	Mansfield, Ohio		6.05 E2			7.00 E2								
	Middletown, Ohio		6.05 A7	6.60 A7	6.625 A7	7.00 A7								
	Niles, Warren, Ohio Sharon, Pa.	4.925 R3, N3, S1	6.05 R3	6.60 R3	6.625 N3, S1	7.00 N3, S1, R3	7.275 R3	8.975 S1, R3				\$8.75 R3		
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 U1, J3, P6	6.05 U1, J3, P6	6.60 U1, J3	6.625 U1		7.275 U1, J3	8.975 U1, J3	9.725 U1	6.15 A5, J3, P6	\$10.05 U1, J3	\$8.75 U1, J3	7.50 U1, J3	
	Portsmouth, Ohio	4.925 P7	6.05 P7							6.15 P7				
	Weirton, Wheeling, Follansbee, W. Va.	4.925 W3, W5	6.05 W3, F3, W5	6.60 W3, W5		7.00 W3, W5	7.275 W3	8.975 W3			\$10.05 W5, W3	\$8.75 W5, W3	7.50 W5	
	Youngstown, Ohio	4.925 U1, Y1	6.05 Y1		6.625 Y1		7.275 Y1	8.975 Y1		6.15 Y1				
	WEST	Fontana, Cal.	5.675 K1	7.30 K1				8.625 K1	10.275 K1			\$10.00 K1	\$9.50 K1	
		Geneva, Utah	5.625 C7											
		Kansas City, Mo.									6.40 S2			
Los Angeles, Torrance, Cal.										6.95 B2				
Minnequa, Colo.										6.40 C6				
San Francisco, Niles, Pittsburgh, Cal.		5.625 C7	7.00 C7	7.35 C7						6.95 C7	\$10.00 C7	\$9.50 C7		
Seattle, Wash.														
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.925 T2, R3	6.05 T2, R3	6.60 T2, R3	6.625 T2					6.15 T2, R3	\$10.15 T2	\$8.85 T2		
	Houston, Tex.									6.40 S2				

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL
PRICES

EAST

MIDDLE WEST

WEST

SOUTH

BARS

PLATES

WIRE

Carbon
SteelReinforc-
ingCold
FinishedAlloy
Hot-
rolledAlloy
Cold
DrawnHi Str.
H.R. Low
AlloyCarbon
SteelFloor
Plate

Alloy

Hi Str.
Low
AlloyMfrs'.
Bright

Bethlehem, Pa.

Buffalo, N. Y.

Claymont, Del.

Coatesville, Pa.

Conshohocken, Pa.

Harrisburg, Pa.

Milton, Pa.

Hartford, Conn.

Johnstown, Pa.

Fairless, Pa.

Newark, N. J.

Camden, N. J.

Bridgeport, Conn.

Putnam, Conn.

Willimantic, Conn.

Sparrows Pt., Md.

Palmer, Worcester,

Roxbury, Mass.

Mansfield, Mass.

Spring City, Pa.

Alton, Ill.

Ashland, Newport, Ky.

Canton, Massillon, Ohio

Chicago, Joliet,

Waukegan, Ill.

Harvey, Ill.

Cleveland, Ohio

Elyria, Ohio

Detroit, Mich.

Duluth, Minn.

Gary, Ind. Harbor,

Crawfordsville,

Hammond, Ind.

Granite City, Ill.

Kokomo, Ind.

Sterling, Ill.

Niles, Warren, Ohio

Sharon, Pa.

Owensboro, Ky.

Pittsburgh, Midland,

Denora, Aliquippa,

Pa.

Perramouth, Ohio

Weirton, Wheeling,

Follansbee, W. Va.

Youngstown, Ohio

Emeryville, Cal.

Fontana, Cal.

Geneva, Utah

Kansas City, Mo.

Los Angeles, Torrance, Cal.

Minnequa, Colo.

Portland, Ore.

San Francisco, Niles,

Pittsburg, Cal.

Seattle Wash.

Atlanta, Ga.

Fairfield, Ala. City,

Birmingham, Ala.

Houston, Ft. Worth,

Lone Star, Tex.

6.475 B3

6.475 B3,R3

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STEEL PRICES

Key to Steel Producers

With Principal Offices

- A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetal Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shifting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shifting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Conners Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.
F1 Furth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

- G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.
H1 Hanna Furnace Corp., Detroit
I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland
J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.
K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.
L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.
O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland
P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit

- P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.
R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebbing Sons Co., John A., Trenton, N. J.
R5 J. & L. Steel Co., Stainless Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.
S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston
U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham
W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheeland Tube Co., Wheeland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pt) f.o.b. mills. Base price about \$200 per net ton.

STANDARD T. & C.	BUTTWELD												SEAMLESS									
	1/2 in.		3/4 in.		1 in.		1 1/4 in.		1 1/2 in.		2 in.		2 1/2-3 in.		2 in.		2 1/2 in.		3 in.		3 1/2-4 in.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. B3	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Youngstown R3	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fontana K1	+8.25	+23.5	+5.25	+19.5	+1.75	+15.00	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00								
Pittsburgh J3	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*0.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Alton, Ill. L1	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.26	+1.25	14.75	+1.50								
Sharon M3	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fairless N2	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Pittsburgh N1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*0.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Wheeling W5	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Westland W4	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Youngstown Y1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*0.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Indiana Harbor Y1	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.75	+1.00								
Lorain N2	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*0.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. B3	7.75	+6.0	11.75	+2.0	14.75	3.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Youngstown R3	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Fairless N2	7.75	+6.0	11.75	+2.0	14.75	3.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Fontana K1	+3.75	0.25			3.25		3.75	4.25		4.75		5.25										
Pittsburgh J3	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*0.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Alton, Ill. L1	7.75	+6.0	11.75	+2.0	14.75	3.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Sharon M3	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Pittsburgh N1	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*0.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Wheeling W5	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Westland W4	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Youngstown Y1	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*0.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Indiana Harbor Y1	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50								
Lorain N2	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*0.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50

Threads only, butt weld and seamless 2 1/4 pt. higher discount. Plain ends, butt weld and seamless, 3-in. and under, 5 1/2 pt. higher discount.

Galvanized discounts based on zinc price range of over 9c to 11c per lb. East St. Louis. For each 2c change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13c to 15c would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 7c to 9c would increase discounts. East St. Louis zinc price now 10c per lb.

(Effective Feb. 24, 1958)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	\$1.795	T-1
18	4	1	—	5	2.50	T-4
18	4	2	—	—	1.96	T-2
1.5	4	1.5	8	—	1.155	M-1
6	4	3	6	—	1.345	M-3
6	4	2	5	—	1.30	M-2
High-carbon chromium...						.925 D-3, D-5
Oil hardened manganese						.475 O-2
Special carbon						.36 W-1
Extra carbon						.35 W-1
Regular carbon						.305 W-1
Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.						

CLAD STEEL

Base prices, cents per lb. f.o.b.

	Plate (A3, J2, L4, C4)			Sheet (J2)
Cladding	10 pct	15 pct	20 pct	20 pct
302				57.50
304	37.95	42.25	46.70	49.00
316	44.40	49.50	54.50	58.75
321	40.05	44.60	49.30	47.25
347	42.40	47.55	52.80	57.00
405	29.85	33.35	36.85	
410	29.55	33.10	36.70	
430	29.80	33.55	37.25	

CR Strip (S9) Copper, 10 pct, 2 sides, 40.25; 1 side, 33.95.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Unthreaded
Bessemer U1	5.525	6.50	6.975				14.75
Cleveland R3							
So. Chicago R3				9.75			
Ensley T2	5.525	6.50			6.60		
Fairfield T2	5.525	6.50		9.75	6.60		
Gary U1	5.525	6.50					
Huntington C16							
Ind. Harbor I3	5.525		6.975	9.75	6.60		
Ind. Harbor Y1				9.75			
Johnstown B3	6.50						
Joliet U1			6.975				
Kansas City S2				9.75			14.75
Lackawanna B3	5.525	6.50	6.975		6.60		
Lebanon B3			6.975		14.50		14.75
Minneapolis C6	5.525	7.00	6.975	9.75	6.60	14.75	
Pittsburgh P5							
Pittsburgh J3				9.75			
Seattle B2				10.25	6.75	15.75	
Steelton B3	5.525		6.975		6.60		
Struthers Y1				9.75			
Torrance C7					6.75		
Williamstown S5	6.50						
Youngstown R3				9.75			

COKE

Furnace, beehive (f.o.b.) Net-Ton
Connellsville, Pa. \$15.00 to \$15.75
Foundry, beehive (f.o.b.) \$17.50 to \$19.00

Foundry oven coke	
Buffalo, del'd	\$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Ia., Pa.	29.25

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1958 season. Freight changes for seller's account.

Openhearth lump	\$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Length)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field		9.625	
Armature	11.10	10.65	11.35
Elect.	11.00	11.55	12.05
Special Motor		12.10	
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
Trans. 65	15.55		
Grain Oriented			
Trans. 58	16.05	Trans. 66	29.20
Trans. 52	17.10	Trans. 80	19.20
		Trans. 73	19.70

Producing points: Beech Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (A9); Niles, O. (N3); Vandergriff (U1); Warren, O. (R3); Zanesville, Butler (A7).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	26.00	40	100, 110	10.70
20	72	25.25	35	110	10.70
18	72	25.75	30	110	10.85
14	72	25.75	24	72 to 84	11.25
12	72	26.25	20	90	11.00
10	60	28.00	17	72	11.40
10	48	28.50	14	72	11.85
7	60	28.25	12	60	12.95
6	60	31.50	10	60	13.60
4	40	35.00	8	60	13.30
3	40	37.00			
2 1/2	30	39.25			
2	24	68.75			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa.
(except Salina, Pa., add \$5.00) \$135.00
No. 1 Ohio 120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill. 120.00
No. 2 Ohio 103.00
Ground fire clay, net ton, bulk
(except Salina, Pa., add \$2.00) 21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. \$150.00
Childs, Hays, Pa. 155.00
Chicago District 160.00
Western Utah 175.00
California 180.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 157.00-160.00

Silica cement, net ton, bulk, Latrobe 28.50
Silica cement, net ton, bulk, Chicago 25.50
Silica cement, net ton, bulk, Ensley, Ala. 26.50
Silica cement, net ton, bulk, Mt. Union 24.50
Silica cement, net ton, bulk, Utah and Calif. 37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt. \$105.00
Standard chemically bonded, Curt-Iner, Calif. 115.00
Burned, Balt. 99.00

Magnesite Brick

Standard Baltimore \$131.00
Chemically bonded, Baltimore 116.00

Grain Magnesite St. % to 1/2-in. grains

Domestic, f.o.b. Baltimore in bulk. \$73.00
Domestic, f.o.b. Chewelah, Wash., in bulk 46.00
in sacks \$2.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio \$16.75
Midwest 17.00
Missouri Valley 15.00

(Effective Feb. 24, 1958)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Col	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal
Alabama City R3	173	187			212	183		8.65	9.20
Altoona J3***	173	190			190			8.65	9.325
Atlanta A8**	175	192			214	198		8.75	9.425
Bartonville K2**	175	192			178	214	198	8.75	9.425**
Buffalo H6								8.65	8.95*
Chicago N4***	173	190			172	212	196	8.65	9.325
Cleveland A6								8.65	
Cleveland A5	175	192			214	198		8.75	9.425
Crawfords M4**	175	192			212	193		8.65	9.20
Donora, Pa. A5	173	187			212	193		8.65	9.20
Duluth A5	173	187			212	193		8.65	9.20
Fairfield, Ala. T2	173	187			212	193		8.65	9.20
Galveston D4	9.10								
Houston S2	178	192			217	198		8.90	9.45
Jacksonville M4	184	197			219	203		9.00	9.675
Johnstown B3**	173	190			172	196**		8.65	9.325**
Joliet, Ill. A5	173	187			212	193		8.65	9.20
Kokomo C9*	175	189			214	195*		8.75	9.30*
L. Angeles B2**								9.60	10.275
Kansas City S2*	178	192			217	198*		8.90	9.45*
Minneapolis C6	178	192			177	217	198	8.90	9.45
Minneapolis P6								8.65	9.20
Palmer, Mass. W6								8.95	9.50*
Pittsburgh, Cal. C7	192	210			213			9.40	10.15
Rankin, Pa. A5	173	187			193			8.65	9.20
So. Chicago R3	173	187			193			8.65	9.20
S. San Fran. C6					236			9.60	10.15
Sparrow Pt. B3**	175	192			214	198		8.75	9.425
Sterling, Ill. N4***	175	192			172	214	198	8.75	9.425
Struthers, O. Y1*								8.65	9.20
Williamstown S5	179							8.95	9.50

* Zinc less than .10¢.

** 11-12¢ zinc.

*** 10¢ zinc.

† Plus zinc extras.

‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. T8	9.50	10.40	12.60	15.60	18.55
Bristol, Conn. W12	10.70	12.90	16.10	19.30	
Boston T8	9.50	10.70	12.90	15.90	18.55
Buffalo, N. Y. R7	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. S9	8.95	10.40	12.60	15.60	18.55
Cleveland A5	8.95	10.40	12.60	15.60	18.55
Dearborn S1	9.05	10.50	12.70		
Detroit D1	9.05	10.50	12.70	15.70	
Detroit D2	9.05	10.50	12.70		
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evansston, Ill. M8	9.05	10.40	12.60		
Franklin Park, Ill. T8	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. C11	9.10	10.55	12.90	16.10	19.30
Indianapolis J3	9.10	10.55	12.90	16.10	18.55
Los Angeles C1	11.15	12.60	14.80	17.80	
New Castle, Pa. B4	8.95	10.40	12.60	15.60	
New Haven, Conn. D1	9.40	10.70	12.90	15.90	
Pawtucket, R. I. N7	9.50	10.70	12.90	15.90	18.55
Pittsburgh S7	8.95	10.40	12.60	15.60	18.55
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. S1	8.95	10.40	12.60	15.60	18.55
Trenton, R4		10.70	12.90	16.10	19.30
Wallingford W1	9.40	10.70	12.90	15.90	18.55
Warren, Ohio T4	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. A5	9.50	10.70	12.90	15.90	18.55
Youngstown J3	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld
	OD-In.	B.W. Ga.	H.R.	C.D.	
Babcock & Wilcox . . .	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
National Tube	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
Pittsburgh Steel . . .	2	13	36.34	42.56
	2½	12	48.94	57.31
	3	12	56.51	66.18
	3½	11	65.97	77.25
	4	10	87.61	102.59

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Beas.	Low Phos.
Birdsboro, Pa. B6	68.00	68.50	69.00	69.50	
Birmingham R3	62.00	62.50			
Birmingham W9	62.00	62.50	66.50		
Birmingham U4	62.00	62.50	66.50		
Buffalo R3	66.00	66.50	67.00	67.50	
Buffalo H1	66.00	66.50	67.00	67.50	
Buffalo W6	66.00	66.50	67.00	67.50	
Chester P2	66.50	67.00	67.50		
Chicago I4	66.00	66.50	66.50	67.00	
Cleveland A5	66.00	66.50	66.50	67.00	71.00
Cleveland R3	66.00	66.50	66.50	67.00	
Duluth I4	66.00	66.50	66.50	67.00	71.00
Erie I4	66.00	66.50	66.50	67.00	71.00
Everett M6	67.50	68.00	68.50		
Fontana K1	75.00	75.50			
Geneva, Utah C7	66.00	66.50			
Granite City G2	67.90	68.40	68.90		
Hubbard Y1			66.50		
Ironton, Utah C7	66.00	66.50			
Midland C11	68.00				
Minnequa C6	68.00	68.50	69.00		
Monessen P6	66.00				
Neville Is. P4	66.00	66.50	66.50	67.00	71.00
N. Tonawanda T1	66.50	67.00	67.50		
Sharpsville S1	66.00	66.50	66.50	67.00	
So. Chicago R3	66.00	66.50	66.50	67.00	
So. Chicago W8	66.00	66.50	66.50	67.00	
Svecland A2	68.30	68.50	69.00	69.50	
Toledo I4	66.00	66.50	66.50	67.00	
Troy, N. Y. R3	68.00	68.50	69.00	69.50	74.00
Youngstown Y1			66.50	67.00	

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, 32¢ per ton for 0.50 to 0.75 pct nickel, 31¢ for each additional 0.25 pct nickel. Add \$1.00 for 0.31-0.49 pct phos.

Silvery Iron: Buffalo, 6 pct, H1, \$79.25; Jackson, I1, I4 (Globe Div.), \$78.00; Niagara Falls (15.01-15.50), \$101.00; Keshuk (14.01-14.50), \$103.50; (15.51-16.00), \$106.50. Add \$1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add \$1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.), \$64.00. Add \$1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingot, re-roll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.30	37.25	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50.00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.00	80.75	65.50	79.25	48.25	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.00	80.75	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, El; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2.

Strip: Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Harrison, N. J., D3; Youngstown, J3; Sharon, Pa., S7; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extras); W1; New Bedford, Mass. (.25¢ per lb higher), R6; Gary, U1 (.25¢ per lb higher).

Bar: Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; S. Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5, R3; Ft. Wayne, I4; Detroit, R5; Gary, U1; Owenboro, Ky., G5.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Vandergrift, Pa., U1; Gary, U1.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R5; Munhall, Pa., S. Chicago, U1; Owenboro, Ky., G5.

(Effective Feb. 24, 1958)

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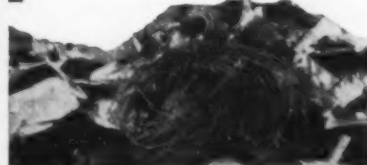


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BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
1½" and smaller x 6" and shorter	49	54	58	57
¾" thru 1" x longer than 6"	35	40	43	45
Roll thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Flow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	60½
¾ in. to 1 in. inclusive	55½
1½ in. to 1½ in. inclusive	58½
1½ in. and larger	53½

C. P. Hex, reg. & hvy.

¾ in. and smaller	60½
¾ in. to 1½ in. inclusive	55½
1½ in. and larger	53½

Hot Galv. Hex Nuts (All Types)

¾ in. and smaller	46½
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Semi-finished Hex Nuts

¾ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1½ in. and larger	53½

(Add 25 pct for broken case or keg quantities)

Finished

¾ in. and smaller	63
-------------------	----

Rivets

	Base per 100 lb
½ in. and larger	\$12.25
7/16 in. and smaller	19

Cap Screws

Discount (Packages) Full Finished H. C. Heat Treat

New std. hex head, packaged

¾" diam. and smaller x 6" and shorter	40	26
¾" ¾" and 1" diam. x 6" and shorter	22	3
¾" diam. and smaller x longer than 6"	8	+13
¾" ¾" and 1" diam. x longer than 6"	+6	+32

C-1018 Steel Full-Finished Cartons Bulk

¼" through ¾" dia. x 6" and shorter	58	49
¾" through 1" dia. x 6" and shorter	45	33
Minimum quantity—¼" through ¾" diam., 15,000 pieces; 1/16" through ¾" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.		

Machine Screws & Stove Bolts

Plain Finish	Discount	Mach. Stove
Cartons	60	Screws Bolts
Bulk	60	

Quantity	
To ¼" diam. incl.	25,000-and over 60
5/16 to ½" diam. incl.	15,000-200,000 60

Machine Screws & Stove Bolt Nuts

Quantity	Discount	Hex Square
In Cartons	16	19

Quantity	
In Bulk	
¾" diam. & smaller	25,000 and over 14 16

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.7
Chicago	140.9
San Francisco-L. A.	148.6
Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.	

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, f.o.b. shipping point)	
Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	42.00
Electrodeposited	33.25
Brass, 80-20, ball anodes, 2000 lb or more	44.00
Zinc, ball anodes, 2000 lb lots	16.50
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.55
Tin, ball anodes \$1.13 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)	
Copper cyanide, 100 lb drum	71.70
Copper sulphate, 100 lb bags, per cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	48.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	24.05
(Philadelphia price 24.50)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum	48.00
N. Y.	
Chromic acid, flake type, 10,000 lb or more	31.00

METAL POWDERS

Per pound, f.o.b. shipping point, in tons lots for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, freight allowed west of Miss. River	9.5¢
Domestic sponge iron, 98+ % Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	10.5¢
Electrolytic iron, annealed, imported 99.5+ % Fe	27.5¢
domestic 99.5+ % Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+ % Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	27.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+ % Fe	88.0¢ to \$2.85
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	31.1¢ to 47.1¢
Copper, electrolytic	41.50¢
Copper, reduced	40.3¢ to 48.8¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe. 03 max. Del'd	\$5.00
Lead	21.50¢ lb, f.o.b. plant
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	\$3.60 to \$3.95
Nickel, chemically precipitated	\$1.05
Nickel, unannealed	\$1.00
Nickel, annealed	\$1.06
Nickel, spherical, unannealed	\$1.13
#80	43.50¢
Silicon	15¢ plus met. value
Solder powder	302
Stainless steel, 302	\$1.02
Stainless steel, 316	\$1.30
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh) \$3.75 (nominal)	
Zinc, 5000 lb & over	17.5¢ to 30.7¢

WARE-HOUSES

Cities	City Delivery Charge	Hot-Rolled (18 ga. & hvy.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled	Standard Structures	Hot-Rolled (merchand)	Cold-Finished	Hot-Rolled 4015 As rolled	Hot-Rolled 4010 Annealed	Cold-Drawn 4015 As rolled	Cold-Drawn 4010 Annealed
Atlanta		8.50	9.87	10.13	8.64	8.97	9.05	9.01	10.68			
Baltimore	\$.10	8.38	8.98	9.71	8.86	8.76	9.29	9.16	11.44*	16.18	15.18	19.73
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57			
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.83	13.00	15.79	15.38	19.89
Buffalo	.15	8.40	9.15	11.22	8.65	9.05	9.05	8.95	11.05*	16.34	15.15	19.01
Chicago	.15	8.35	9.60	10.25	8.38	8.71	8.79	8.75	8.95	15.80	14.80	19.35
Cincinnati	.15	8.49	9.65	10.20	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96
Cleveland	.15	8.33	9.60	10.10	8.48	8.94	9.16	8.84	10.95*	15.89	14.89	19.44
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65			17.60
Detroit	.15	8.58	9.85	10.60	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81
Houston		7.45	8.75		7.60	8.05	7.60	7.55	11.10	16.20		19.30
Kansas City	.20	9.02	10.27	10.07	9.05	9.38	9.46	9.42	9.87	20.02	15.47	20.02
Los Angeles	.10	8.60**	10.85	11.75	8.65	8.65	8.70	8.65	13.35*	17.05	16.10	21.05
Memphis	.15	8.55	9.80		8.60	8.93	9.01	8.97	12.11*			
Milwaukee	.15	8.48	9.73	10.38	8.51	8.84	9.00	8.88	9.18	15.43	14.93	18.78
New York	.10	8.97	10.23	10.66	9.41	9.53	9.45	9.67	12.86*	15.02	15.19	18.42
Norfolk	.20	8.00			8.40	8.35	8.70	8.45	10.70			
Philadelphia	.10	8.10	9.00	9.97	8.79	8.87	8.60	8.75	11.61*	15.61	15.11	18.96
Pittsburgh	.15	8.33	9.60	10.60	8.48	8.71	8.79	8.75	10.95*	15.80	14.80	19.35
Portland		8.50	11.20	11.55	9.05	8.30†	8.65	8.65	14.50	18.50	16.10	20.75
San Francisco	.10	9.45	10.85	11.10	9.55	9.70	9.60	9.80	13.10	17.05	16.10	21.05
Seattle		9.95	11.15	12.00	10.00	9.70	9.80	10.80	14.05	16.55	16.25	20.45
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20		17.35	21.55
St. Louis	.15	8.69	9.94	10.61	8.74	9.08	9.25	9.12	9.56	15.66	15.16	19.01
St. Paul	.15	8.94	10.19	10.86	8.99	9.45	9.53	9.37	9.81		15.26	

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** All sizes except 18 and 16 gage. †† 10¢ zinc. ‡ Deduct for country delivery. † 3/16 in. to ½ in. • C1018—1 in. rounds.

(Effective Feb. 24, 1958)

Your Sales Battles Won Easier with Phillips Screw Quality Control Plan

George Romney, industrial statesman, sums up the quality-control activity of the Screw Research Association this way:

"Control that assures a good quality product is one of the most important assets any industrial organization can have."

The Phillips Cross-Recessed Head Standards Committee has set up standards assuring reliability in delivering every advantage inherent in the Phillips Recess design. This means adherence to the best possible dimensional designs and the use of recommended inspection gauges and methods.

Phillips Screws made by the companies listed below improve your products, assure their faster safety and reduce your production costs.



MR. GEORGE ROMNEY is president, American Motors Corporation and president, Automobile Manufacturers Association. He says, pertinent to the Screw Research Association's plan, "The more care you use in selecting top quality materials and parts, the easier it is for you to win your sales battle."



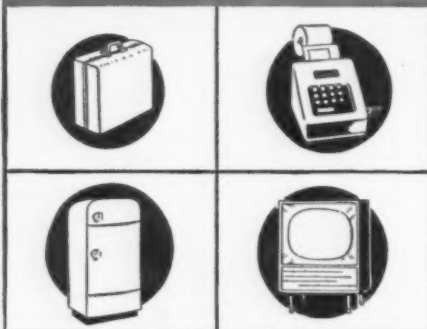
Members of Screw Research Association...

You can rely on these sources . . . for product reliability

American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Co. • Elco Tool and Screw Corporation • Great Lakes Screw Corp. • The H. M. Harper Company • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Company • Parker-Kalon Division, General American Transportation Corporation • Pheoll Manufacturing Co. • The Progressive Manufacturing Company Division, The Torrington Company • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hdwe. Mfg. Company
Sterling Bolt Company • Universal Screw Company • Wales-Beech Corporation

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colorful, practical vinyl plastic
for lamination to metal



- Can be permanently laminated to metal . . . flat sheets or continuous coil.
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- Won't chip, peel or fade.
- Resists abrasion.
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- Forming or stamping can be done on present equipment.
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A new and more functional finish for greater sales appeal. That's Masland Duran Clad, bringing the texture, warmth and color versatility of practical vinyl to countless products. Find out how your product can have this modern money-saving finish. Write for free folder.

Industrial Products Division

THE MASLAND DURALEATHER CO.,
Dept. 1A, Amber and Willard Streets, Philadelphia 34, Pa.

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WILLIAMS-WHITE HYDRAULIC BULLDOZERS



The photograph illustrates a WILLIAMS-WHITE Hydraulic Bulldozer bending angle sections into complete circles as an initial step in the production of blade circle assemblies for use on road scrapers. The completed ring with gear inserted is shown at right in photo.

This is another example of the versatility of WILLIAMS-WHITE Hydraulic Bulldozers, available in capacities from 50 through 500 tons. For full information regarding these or other machines built to your specifications, write us or one of our representatives.



BUILDERS OF MACHINERY SINCE 1854

WILLIAMS-WHITE & Co.

302 EIGHTH ST. • MOLINE, ILLINOIS

PRESSES • BULLDOZERS • BENDERS • PUNCHES • SHEARS

REPRESENTATIVES

CALIFORNIA, Los Angeles: George A. Davies Mach'y Co.
ILLINOIS, Chicago: WILLIAMS-WHITE & CO., 53 W. Jackson Blvd.
MICHIGAN, Detroit: E. E. Wood Mach'y Co.
MISSOURI, St. Louis or Kansas City: Robt. R. Stephens Mach'y Co.
OHIO, Cincinnati: Columbus or Dayton: Seifert-Elsdorf Mach'y Co.
Cleveland: A. L. Bechtel & Son
OREGON, Portland: Allied Northwest Mach. Tool Corp.
PENNSYLVANIA, Pittsburgh: Frank Ryman's Sons
Wynnewood (Phila.): Edw. A. Lynch Mach'y Co.
WASHINGTON, Seattle: Perine Mach'y & Supply Co.
WISCONSIN, Milwaukee: Pagel Mach'y Co.

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.			
0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25
4.00-4.50% C, 60-70% Cr, 1-2% Si....			28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si....			27.50
0.025% C (Simplex).....			36.75
7-8 1/2% max C, 50-55% Cr, 3-6% max Si.....			25.00
7-8 1/2% max C, 50-55% Cr, 3% max Si.....			25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.	
0.10% max. C.....	\$1.31
0.50% max. C.....	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe....	1.40

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (1/4" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.	
Carloads.....	\$1.29
Ton lots.....	1.31
Less ton lots.....	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-46%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.		
Price is sum of contained Cr and contained Si.		
	Cr	Si
Carloads.....	27.50	14.20
Ton lots.....	32.75	15.65
Less ton lots.....	34.35	17.30

Calcium-Silicon

Per lb of alloy, lump, delivered, packed, 30-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads.....	25.65
Ton lots.....	27.95
Less ton lots.....	29.45

Calcium-Manganese-Silicon

Cents per lb of alloy, lump, delivered, packed.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads.....	24.25
Ton lots.....	26.15
Less ton lots.....	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/2 in. x 12 mesh.	
Ton lots.....	\$1.15
Less ton lots.....	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.	
Carload lots.....	17.20
Ton lots.....	18.70
Less ton lots.....	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed.....	18.50
Ton lots to carload packed.....	19.65
Less ton lots.....	20.90

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.....	12.25
Johnstown, Pa.....	12.25
Neville Island, Pa.....	12.25
Sheridan, Pa.....	12.25
Philo, Ohio.....	12.25
S. Duquesne.....	12.25
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.	
Briquets, delivered, 66 pct Mn:	
Carloads, bulk.....	14.80
Ton lots packed.....	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.	
Manganese	Silicon
16 to 19%.....	3% max.\$100.50
19 to 21%.....	3% max.102.50
21 to 23%.....	3% max.105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed.....	45.75
Ton lots.....	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
Carloads.....	34.00
Ton lots.....	36.00
250 to 1999 lb.....	38.00
Premium for Hydrogen - removed metal.....	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn.....	
	25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, del'd Mn 85-90%.			
	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn.....	37.15	39.95	41.15
0.07% max. C.....	35.10	37.90	39.10
0.10% max. C.....	34.35	37.15	38.35
0.15% max. C.....	33.60	36.40	37.60
0.30% max. C.....	32.10	34.90	36.10
0.50% max. C.....	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si.....	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.	
Carloads bulk.....	12.80
Ton lots, packed.....	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet.....	15.10
Ton lots, packed, pallets.....	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	
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Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.		
	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe.....	24.20	22.90
98% Si, 0.75% Fe.....	24.95	23.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.	
Carloads, bulk.....	7.70
Ton lots, packed.....	10.50

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.	
50% Si.....	14.20
65% Si.....	15.25
75% Si.....	16.40
85% Si.....	18.10
90% Si.....	19.50

Ferrovandium

50-55% V delivered, per pound, contained V, carloads, packed.	
Openhearth.....	3.20
Crucible.....	3.30
High speed steel (Primus).....	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.		
	Cast	Turnings
Ton lots.....	\$2.05	\$2.95
Less ton lots.....	2.40	3.30
		Distilled
		4.55

(Effective Feb. 24, 1958)

Alisfer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads.....	10.65¢
Ton lots.....	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo.....

	\$1.28
--	--------

Ferrocolumbium, 50-50%, 2 in. x D, delivered per pound contained Cb.

Ton lots.....	\$4.90
Less ton lots.....	4.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Sb plus Ta.....

	\$4.25
--	--------

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.....

	\$1.68
--	--------

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton.....

	\$90.00
--	---------

10 tons to less carload.....

	\$110.00
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Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti.....

	\$1.35
--	--------

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti.....

	\$1.50
--	--------

Less ton lots.....

	\$1.54
--	--------

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton.....

	\$240.00
--	----------

Ferrotungsten, 1/2 x down packed, per pounds contained W, ton lots delivered.....

	\$2.60 (nominal)
--	------------------

Molybde oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa.....

	\$1.41
--	--------

bags, f.o.b. Washington, Pa., Langeloth, Pa.....

	\$1.38
--	--------

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.....

	18.50¢
--	--------

Carload, bulk lump.....

	20.50¢
--	--------

Ton lots, packed lump.....

	21.00¢
--	--------

Less ton lots.....

--	--

Vanadium oxide, 86-89% V₂O₅ per pound contained V₂O₅.....

	\$1.38
--	--------

Zirconium, per lb of alloy, 35-40% f.o.b. freight allowed, carloads, packed.....

	27.25¢
--	--------

12-15%, del'd lump, bulk-carloads.....

	9.25¢
--	-------

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B.....

	\$5.50
--	--------

2000 lb carload.....

--	--

Bortram, f.o.b. Niagara Falls, Ton lots per pound.....

	45¢
--	-----

Less ton lots, per pound.....

	50¢
--	-----

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.....

	14.00¢
--	--------

Ton lots per pound.....

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Ferrocobalt, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.....

	\$1.20
--	--------

F.o.b. Wash. Pa., Niagara Falls, N. Y., delivered 100 lb up.....

--	--

10 to 14% B.....

	.85
--	-----

14 to 19% B.....

	1.20
--	------

19% min. B.....

	1.50
--	------

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over No. 1.....

	\$1.05
--	--------

No. 79.....

	50¢
--	-----

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.....

	\$1.46
--	--------

Ton lots.....

	1.57
--	------

Less ton lots.....

--	--

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots.....

	2.15
--	------

Do your machines have a **Built-in Future?**



When you buy new hobbing machines, gear your thinking to the future.

It is not enough just to meet today's production requirements. The machines you buy now must have "built-in" features that will measure up to the high-speed production demands of tomorrow.

The Lees-Bradner Company manufactures a complete line of hobbing machines designed to fulfill varied requirements.

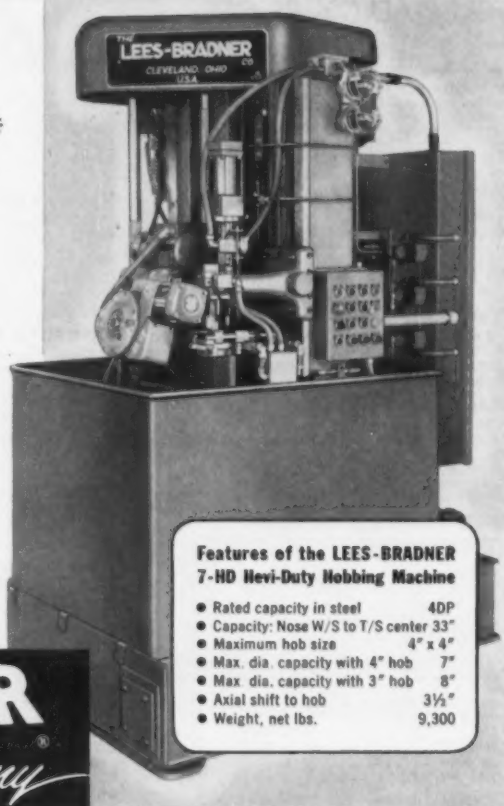
For example, this 7-HD Hevi-Duty Single Spindle Hobbing Machine is built to hob today at tomorrow's higher feeds and speeds. It's a heavy, powerful machine equipped with a new hob head featuring an axial shift of 3½ inches.

The 7-HD is also available in 4 and 6-spindle rotary models.

For complete technical information on Lees-Bradner "years ahead" Hobbing Machines send for your free 7-HD brochure . . . or contact the Lees-Bradner representative in your area.

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- Rated capacity in steel 4DP
- Capacity: Nose W/S to T/S center 33"
- Maximum hob size 4" x 4"
- Max. dia. capacity with 4" hob 7"
- Max. dia. capacity with 3" hob 8"
- Axial shift to hob 3½"
- Weight, net lbs. 9,300

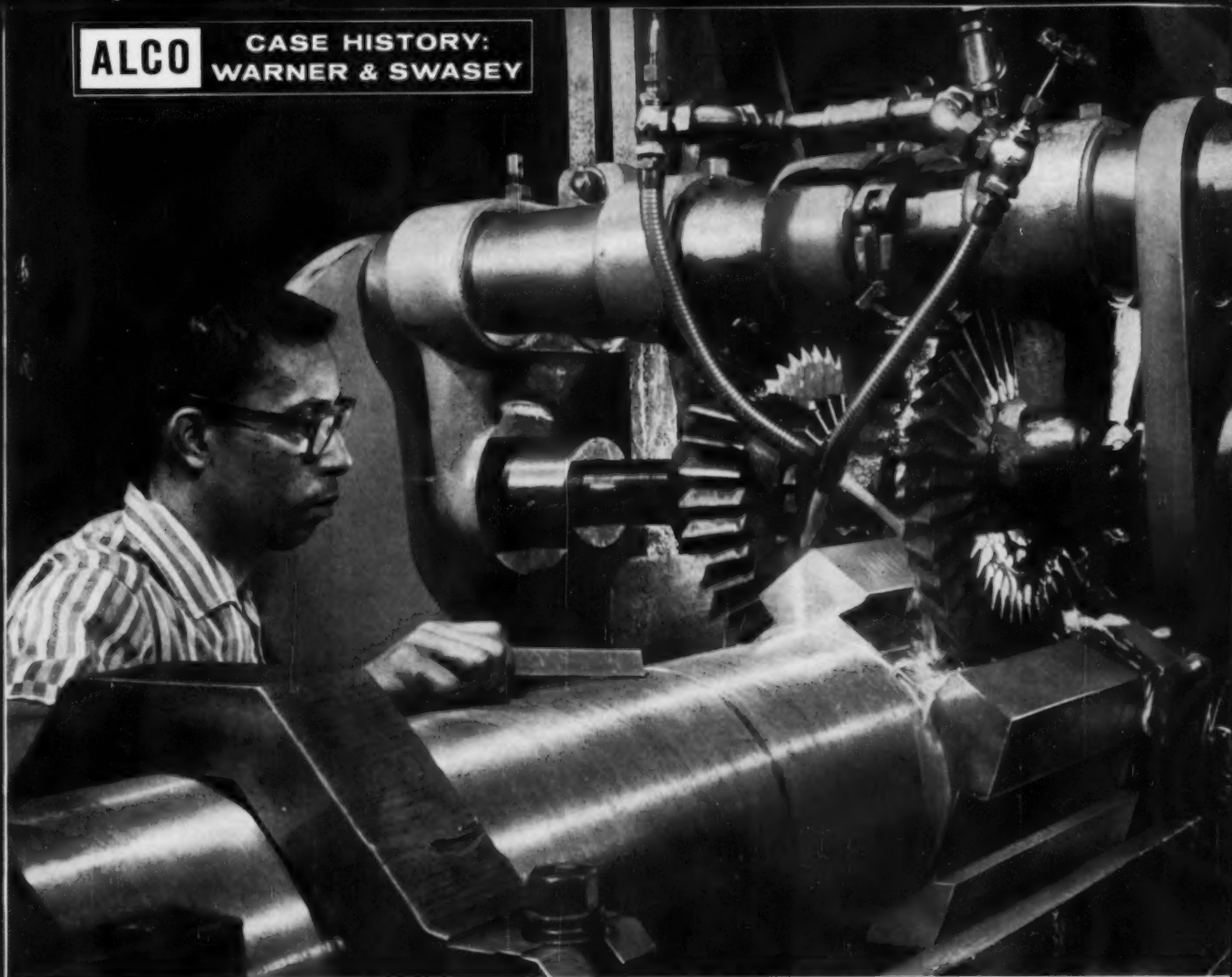
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With ALCO's Hi-Qua-Led Steel forgings, Warner & Swasey reduced time for straddle-mill dovetailing of tool holder's pentagon shape by 71%.

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With open-die forgings of ALCO's special free-machining Hi-Qua-Led Steel, Warner & Swasey has reduced machining time 33% on a pentagon-bar tool holder for their automatic chucking machine. Time for the various milling operations has been reduced as much as 71%, and turning time 33%.

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Contact your nearest ALCO sales office for full information on the many advantages of Hi-Qua-Led Steel forgings, or write ALCO Products, Department 154, Schenectady, New York.

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ELECTRICAL POWER EQUIPMENT

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3000	Willott		475	320
1	2250	Willott		600	300/300
1	2200	G.E.	MCF	600	400/500
1	1750	Willott		250	175/350
1	1500	Whase.		525	600
1	1375	G.E.	MCF	415	1300
1	1200	G.E.	MCF	600	450/600
1	940	Whase.	QM	250	140/170
3	800	G.E.	MCF	250	800/750
3	450	Whase.		550	415
2	300	G.E.	MFC	230	400
1	200	Whase.	CB-287.4	250	850/1200
2	125	Whase.	SK-180	230	450/1200
1	150	G.E.	CDBB	600	250/700
1	150	Cr. Wh.	65-H	230	1150
1	125	Whase.	SK-185	230	350/1050
2	100	Whase.	SK-181	230	450/1000
1	60/100	G.E.	RP-17	230	450/900
2	75	Cr. Wh.	53HTEFC	230	800
6	40	Rel. RB	505TEFC	230	500/1500
1	30/40	Whase. D.F.	SK-131.5-RB	230	500/1500
3	30	G.E.	CDM-85-RB	230	2300
(unused)					
1	125/150	Whase.	CB-210.3	230	800/1200
(unused)					
with Rubber Calender Control Class #8860					

MG SETS—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	250	G.E.	900	125	4100/2300/440
1	2800	G.E.	511	600	2300/4600
2	1750/2100	G.E.	514	250/300	2500/4600
1	1500	G.E.	600	600	2300/4150
1	1300	G.E.	729	600	6000/13200
2	1000	G.E.	729	600	6000/13200
1	500	Whase.	900	125/250	440
2	300	G.E.	1200	250	2300
1	250	Whase.	1200	275	2300
1	200	El. Ma.	1200	250	2300/4600
1	200	Whase.	1200	250	2300
1	200	G.E.	1200	250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltagess
3	3333	Whase.	OISC	1	13800 x 2300
1	1500	G.M. auto	HT	3	4000/4200/4400
3	1000	G.E.	HVDDJ	1	3400 x 450
3	1000	G.E.	OA/FA	1	12000 x 230/460
2	750	G.E.	Pyranol	1	4800 x 85/55
2	500	Kuhl	OISC	1	13200 x 6000

CRANE & MILL MOTORS

230 V., D.C.

Qu.	H.P.	Make	RPM	Type
1	3	Whase.	835	HK-2
4	3	Cr. Wh.	1750	SCM-FF
1	5 1/2	Whase.	600	MC-20
3	6 1/2	Whase.	700/600	MCA-20
1	7 1/2	G.E.	700	MD-406AE
1	10	G.E.	400/800	MD-104
2	10	G.E.	750	COM-1825—
				Series B.B.
1	10	G.E.	925	CO-1805—
				Series S.B.
1	10	G.E.	750	CO-1805—
				Series S.B.
1	20	Whase.	975	K-5
3	10	Cr. Wh.	1130	SCM-AH
3	15	Cr. Wh.	1130	SCM-BA
14	12/15	Whase.	700/600	MCA-30
2	25	G.E.	825	MDN-408.
				MDN-408-AE
2	25	G.E.	650	MDN-408-AE
				Ser.
2	25	G.E.	725	CO-1808 Ser.
1	35	Whase.	480	CK-9-Comp. S.B.
1	35	Whase.	480	CK-9-Shunt R.R.
1	45	Whase.	600	CK-9-Comp. S.B.
1	50	Cr. Wh.	550	SW-50
3	50	G.E.	650	COM-1820 Comp.
3	50	Whase.	825	CK-9-Shunt R.R.
2	50	Whase.	600	CK-9-Comp. R.B.
1	50	G.E.	850	MD-412AE—
				Comp. R.B.
5	100/140	Whase.	500/415	Mc-80 Series
1	100	G.E.	475	CO-1832—
				Series S.B.
9	125	G.E.	625	CO-1832—
				Series S.B.

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THE CLEARING HOUSE

Buyers Are Cautious At Philadelphia

Used machinery sales there reflect the reduced pace of industrial activity.

Sellers say buyers are waiting until conditions improve before coming into the market for needed equipment.

■ Philadelphia area used machinery dealers are trying to ride out the current economic squall and hoping it won't last too long.

"I'm conducting my sales activity on a strictly business basis," says one dealer. "Equipment doesn't go out to customers unless the sale is for cash or unless I can get a judgment to recover the property if necessary."

The temptation to buy machinery for inventory right now is hard to fight down, he adds. Prices have softened and lots of good, late-model equipment is available. However, he and other dealers are keeping a close watch on stocks, preferring not to become inventory poor.

No Long-Range Blues — While the dealers are discouraged about the current market, they are not depressed about the long-range outlook. They feel that if the economy is given a prod the stimulation will be felt by buyers of used machinery. Until this happens they are resigned to a sluggish market. Some buyers, they report, have put the lid on any capital expenditures until at least July. And production men are being discouraged from buying needed tools.

Prices Are Down — Prices have been in a decline the last six

months, both at auction sales and private liquidations. But dealers believe customers who wait six months or so to buy in the hope of getting even lower prices are going to be disappointed.

"I've got several tools that are realistically priced," one seller says. "I'm not going to give the equipment away. I'd rather put it in mothballs and wait until the market improves."

Production Units Slow—Hardest hit in the current market are production tools. Toolroom equipment is a little better and some non-machine items are moving well.

Among items listed as moving fairly well are overhead cranes, welding equipment, and compressors. Special purpose tools seem to be more popular than standard equipment.

The market for presses is not strong. Some customers are active, but they are not willing to pay the prices quoted. This despite the fact that one dealer reports press prices are 15 to 20 pct below previous levels.

As evidence of how prices have fallen he mentions a large 400 ton press put up at a mid-west auction about a year ago and bid in at \$70,000. When re-offered again recently it drew a top bid of only \$32,000.

Selling Is Tough — Although dealers can usually find the tools buyers want some items are not too plentiful in the local market. Harder to locate are late model toolroom lathes, squaring shears, ironworkers, apron brakes, and hydraulic roll presses.

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 10' x 10" Ga. Bertch Initial Type
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 10' x 1/2" & 12' x 1/2" Hydraulic—NEW

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 5 ton P&H 50' Span 220/3/60
 5 ton P&H 50' Span 110 Volt D.C.
 5 ton Cleveland 60' Span 110 Volt D.C.
 5 ton Shepard Niles 70' Span 220 Volt D.C.
 8 ton P&H 55' Span 220/3/60
 10 ton Shepard Niles 38' Span 440/3/60
 10 ton Shaw 48' Span 220 Volt D.C.
 10 ton Shaw 120' Span 220 Volt D.C.
 15 ton Shepard Niles 35' Span 220 Volt D.C.
 20 ton Shaw 35' Span 220 Volt D.C.
 50 ton Northern 85' Span 440/3/25 A.C.
 120 ton P&H 68' Span 220/3/60 A.C.
 120 ton Shepard Niles 77' Span 220/3/60

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 1500 ton Mesta Steam Hydr. Forging Press
 4500 Baldwin-Lima-Hamilton Hydr. Forging Press

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PRESSES—STRAIGHT SIDE
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 Cleveland Style C, Arch. Jaw, Capy. 1/2" x 1/2"
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Four, Five, Six, Eight Spindles • Work and Tool Rotating Type

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In cold-drawing, the alloy bar is machine-pointed, to reduce the size at one end so it will pass easily into the die opening. Otherwise, the bar is pushed or extruded into the die by an auxiliary device. A die-holder, which can be made to contain from one to four dies, is mounted in an appropriate head assembled across a "draw bench," so that from one to four bars can be drawn at the same time. The draw bench has a bed which accommodates a 4-wheel buggy with jaws that grip the pointed ends of the bars as they emerge from the dies. The buggy has a hook on one end which engages an endless chain,

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BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

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BETHLEHEM STEEL

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it processes automobile parts 24 ways—and relies on Trabon

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Close up indicates Trabon pumps and feeders lubricating this new automated Snyder Transfer machine. Single indication at the pump guarantees positive lubrication of all bearings regardless of location.

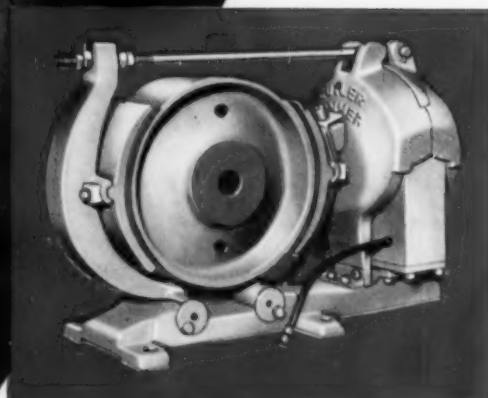


Trabon Engineering Corporation

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The Cutler-Hammer 505 Mill Brake can be adjusted perfectly in total darkness



Why Mill Men Prefer the Cutler-Hammer 505

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Compare the Cutler-Hammer 505 Mill Brake with any others. The biggest users of magnetic brakes say the 505 has no equal . . . in design, in construction, and in performance. Compare and prove it. CUTLER-HAMMER Inc., 1325 St. Paul Ave., Milwaukee 1, Wisconsin. Associate: Canadian Cutler-Hammer Ltd., Toronto.